THE COMMISSION VOLUME 2

Site Inspection. Volume 1 built the pavilion. Volume 2 is the walk-round that finds what the first pass missed — and there was more than we expected.

Why there is a Volume 2

Two documents changed the plan. Both are published by EQAO, both are linked from the Toronto District School Board's own EQAO Math Resources page, and neither had been read when Volume 1 was written.

Document	What it changed
The Grade 6 Formula Sheet	Students are **given** six area formulas in the assessment — rectangle, parallelogram, triangle, trapezoid, **rhombus and kite**. So the skill being tested is **choosing and applying** a formula, not recalling one. Volume 1 practised recall. It also never covered rhombus or kite area at all, even though expectation **E2.4** names both.
The Junior-Division Glossary	The official vocabulary list students may consult during the assessment. Reading it end to end surfaced **thirteen** topics that are fair game and were missing from Volume 1 — factor trees, rotational symmetry, reflections, stem-and-leaf plots, samples, infographics, experimental probability, code efficiency, discounts, mortgages, and more.

This is what a second pass is for. Volume 1 was built from the Framework and the released questions, and it was accurate as far as it went. It simply did not go far enough. Everything in Volume 2 is content the assessment can ask for and Volume 1 did not practise.

Designer

Original questions throughout. Nothing here is copied from TDSB, EQAO or any other publisher. The two EQAO documents were read to work out *what to cover*; every question was written for this book.

FOR THE TEACHER · WHAT IS NEW

The thirteen gaps, and where they are closed

If you have Volume 1, this table is the fastest way to see what Volume 2 adds. Nothing is repeated for its own sake.

Code	What was missing from Volume 1	Sheet
E2.4	**Rhombus and kite area from the diagonals.** Both named in the expectation, both on the formula sheet, neither in Volume 1	5
E2.4	**Parallelogram and triangle area**, and choosing which formula to use	3-4
E2.4	The **slant-height trap** — using the sloping side instead of the perpendicular height	4
B2.6	**Prime factorisation and factor trees.** Volume 1 only asked students to spot primes	7-8
E1.1	**Rotational symmetry of order n**, and how it differs from lines of symmetry	9-10
E1.4	**Reflections** and lines of reflection; combinations of transformations	11-12
D1.3	**Stem-and-leaf plots, line plots and tally tables** — all three in the glossary	13-14
D1.2	**Samples**, and what makes one biased	15
D1.4	**Infographics**	15
D2.2	**Experimental** probability, and why it differs from theoretical	16
C3.2	**Code efficiency** — the expectation says "and the efficiency of the code"	17-18
F1.1	**Discounts**, and the trap of answering with the discount instead of the price	19
F1.4	**Savings versus chequing, mortgages, fees, investments, income**	20-21
B1.1	**Expanded form**	22

How the book is laid out

Part 1 — New ground (sheets 3-24). One sheet per gap, twelve questions each.

Part 2 — The glossary (sheets 25-27). The official vocabulary, both directions. Mathematical language is a named weakness across every strand, and students *are* given the glossary in the assessment — so knowing it is worth marks.

Part 3 — Twelve weeks (sheets 28-39). Ten questions a week, mixed across strands. This follows the weekly cadence TDSB uses on its own resources page, because it is a pattern teachers already run.

Part 4 — Papers 3 and 4 (sheets 40-49). Two more full papers to the exact blueprint, now including the Volume 2 content.

The formula sheet is free, official and one page. Print it and let students use it from the start. They will have it on the day, and practising without it trains the wrong skill. It is at **eqao.com** — search "Grade 6 formula sheet". The glossary is there too.

Also worth knowing: TVO's **Mathify** offers free one-to-one online tutoring for Ontario students in Grades 4-12, weekday evenings and weekend afternoons. Linked from the same TDSB page. For a student who is stuck on one specific expectation, that is a better use of an hour than another worksheet.

NEW GROUND · SHEET 3

Which Formula, And Why

Strand E · Spatial Sense — 9 of the 44 questions (20%) · E2.4

You are GIVEN all six area formulas. The mark is for choosing the right one.

1 You are given the formula sheet. Which formula do you need for **a parallelogram with base 14 cm and perpendicular height 9 cm?** E2.4 · KU

- A $A = c \times d \div 2$
- B $A = (b_1 + b_2) \times h \div 2$
- C $A = b \times h \div 2$
- D $A = b \times h$

2 You are given the formula sheet. Which formula do you need for **a kite with diagonals 14 cm and 8 cm?** E2.4 · KU

- A $A = b \times h$
- B $A = (b_1 + b_2) \times h \div 2$
- C $A = c \times d \div 2$
- D $A = b \times h \div 2$

3 You are given the formula sheet. Which formula do you need for **a rhombus with diagonals 10 cm and 6 cm?** E2.4 · KU

- A $A = c \times d \div 2$
- B $A = (b_1 + b_2) \times h \div 2$
- C $A = b \times h \div 2$
- D $A = b \times h$

4 You are given the formula sheet. Which formula do you need for **a kite with diagonals 14 cm and 8 cm?** E2.4 · KU

- A $A = b \times h$
- B $A = (b_1 + b_2) \times h \div 2$
- C $A = c \times d \div 2$
- D $A = b \times h \div 2$

5 You are given the formula sheet. Which formula do you need for **a kite with diagonals 14 cm and 8 cm?** E2.4 · KU

- A $A = b \times h \div 2$
- B $A = (b_1 + b_2) \times h \div 2$
- C $A = c \times d \div 2$
- D $A = b \times h$

6 You are given the formula sheet. Which formula do you need for **a trapezoid with parallel sides 8 cm and 12 cm and height 5 cm?** E2.4 · KU

- A $A = b \times h \div 2$
- B $A = (b_1 + b_2) \times h \div 2$
- C $A = c \times d \div 2$
- D $A = b \times h$

7 You are given the formula sheet. Which formula do you need for **a rhombus with diagonals 10 cm and 6 cm?** E2.4 · KU

- A $A = b \times h \div 2$
- B $A = (b_1 + b_2) \times h \div 2$
- C $A = b \times h$
- D $A = c \times d \div 2$

8 You are given the formula sheet. Which formula do you need for **a trapezoid with parallel sides 8 cm and 12 cm and height 5 cm?** E2.4 · KU

- A $A = b \times h \div 2$
- B $A = (b_1 + b_2) \times h \div 2$
- C $A = b \times h$
- D $A = c \times d \div 2$

9 You are given the formula sheet. Which formula do you need for **a trapezoid with parallel sides 8 cm and 12 cm and height 5 cm?** E2.4 · KU

- A $A = c \times d \div 2$
- B $A = b \times h$
- C $A = (b_1 + b_2) \times h \div 2$
- D $A = b \times h \div 2$

10 You are given the formula sheet. Which formula do you need for **a parallelogram with base 14 cm and perpendicular height 9 cm?** E2.4 · KU

- A $A = b \times h \div 2$
- B $A = c \times d \div 2$
- C $A = (b_1 + b_2) \times h \div 2$
- D $A = b \times h$

11 You are given the formula sheet. Which formula do you need for **a triangle with base 16 cm and height 7 cm**? E2.4 · KU

- ◯ **A** $A = c \times d \div 2$
- ◯ **B** $A = b \times h \div 2$
- ◯ **C** $A = b \times h$
- ◯ **D** $A = (b_1 + b_2) \times h \div 2$

12 You are given the formula sheet. Which formula do you need for **a trapezoid with parallel sides 8 cm and 12 cm and height 5 cm**? E2.4 · KU

- ◯ **A** $A = (b_1 + b_2) \times h \div 2$
- ◯ **B** $A = b \times h$
- ◯ **C** $A = b \times h \div 2$
- ◯ **D** $A = c \times d \div 2$

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

NEW GROUND · SHEET 4

The Perpendicular Height

Strand E · Spatial Sense — 9 of the 44 questions (20%) · E2.4

A = b × h means the PERPENDICULAR height. Never the sloping side.

1 A parallelogram has a base of **14 cm**, a slanted side of **11 cm**, and a perpendicular height of **9 cm**. What is its area? E2.4 · AP

- A 126 cm²
- B 63 cm²
- C 50 cm²
- D 154 cm²

2 A parallelogram has a base of **14 cm**, a slanted side of **11 cm**, and a perpendicular height of **9 cm**. What is its area? E2.4 · AP

- A 63 cm²
- B 154 cm²
- C 126 cm²
- D 50 cm²

3 A parallelogram has a base of **9 cm**, a slanted side of **7 cm**, and a perpendicular height of **5 cm**. What is its area? E2.4 · AP

- A 32 cm²
- B 22 cm²
- C 63 cm²
- D 45 cm²

4 A parallelogram has a base of **14 cm**, a slanted side of **11 cm**, and a perpendicular height of **9 cm**. What is its area? E2.4 · AP

- A 126 cm²
- B 50 cm²
- C 63 cm²
- D 154 cm²

5 A parallelogram has a base of **14 cm**, a slanted side of **11 cm**, and a perpendicular height of **9 cm**. What is its area? E2.4 · AP

- A 126 cm²
- B 63 cm²
- C 154 cm²
- D 50 cm²

6 A parallelogram has a base of **14 cm**, a slanted side of **11 cm**, and a perpendicular height of **9 cm**. What is its area? E2.4 · AP

- A 126 cm²
- B 63 cm²
- C 50 cm²
- D 154 cm²

7 A parallelogram has a base of **14 cm**, a slanted side of **11 cm**, and a perpendicular height of **9 cm**. What is its area? E2.4 · AP

- A 63 cm²
- B 154 cm²
- C 126 cm²
- D 50 cm²

8 A parallelogram has a base of **10 cm**, a slanted side of **8 cm**, and a perpendicular height of **6 cm**. What is its area? E2.4 · AP

- A 60 cm²
- B 30 cm²
- C 36 cm²
- D 80 cm²

9 A parallelogram has a base of **9 cm**, a slanted side of **7 cm**, and a perpendicular height of **5 cm**. What is its area? E2.4 · AP

- A 32 cm²
- B 63 cm²
- C 45 cm²
- D 22 cm²

10 A parallelogram has a base of **14 cm**, a slanted side of **11 cm**, and a perpendicular height of **9 cm**. What is its area? E2.4 · AP

- A 63 cm²
- B 126 cm²
- C 154 cm²
- D 50 cm²

11 A parallelogram has a base of **14 cm**, a slanted side of **11 cm**, and a perpendicular height of **9 cm**. What is its area? E2.4 · AP

- **A** 154 cm^2
- **B** 126 cm^2
- **C** 50 cm^2
- **D** 63 cm^2

12 A parallelogram has a base of **9 cm**, a slanted side of **7 cm**, and a perpendicular height of **5 cm**. What is its area? E2.4 · AP

- **A** 22 cm^2
- **B** 63 cm^2
- **C** 32 cm^2
- **D** 45 cm^2

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

Rhombus And Kite Area

Strand E · Spatial Sense — 9 of the 44 questions (20%) · E2.4

Both are on the formula sheet, and both use the DIAGONALS. Volume 1 never covered these.

1 A **rhombus** has diagonals of **16 cm** and **6 cm**. What is its area? E2.4 · AP

- A $96\ cm^2$
- B $22\ cm^2$
- C $48\ cm^2$
- D $44\ cm^2$

2 A **kite** has diagonals of **16 cm** and **6 cm**. What is its area? E2.4 · AP

- A $44\ cm^2$
- B $96\ cm^2$
- C $22\ cm^2$
- D $48\ cm^2$

3 A **rhombus** has diagonals of **12 cm** and **8 cm**. What is its area? E2.4 · AP

- A $20\ cm^2$
- B $40\ cm^2$
- C $48\ cm^2$
- D $96\ cm^2$

4 A **rhombus** has diagonals of **14 cm** and **10 cm**. What is its area? E2.4 · AP

- A $70\ cm^2$
- B $24\ cm^2$
- C $140\ cm^2$
- D $48\ cm^2$

5 A **rhombus** has diagonals of **14 cm** and **10 cm**. What is its area? E2.4 · AP

- A $70\ cm^2$
- B $24\ cm^2$
- C $48\ cm^2$
- D $140\ cm^2$

6 A **kite** has diagonals of **16 cm** and **6 cm**. What is its area? E2.4 · AP

- A $96\ cm^2$
- B $22\ cm^2$
- C $48\ cm^2$
- D $44\ cm^2$

7 A **rhombus** has diagonals of **12 cm** and **8 cm**. What is its area? E2.4 · AP

- A $48\ cm^2$
- B $20\ cm^2$
- C $40\ cm^2$
- D $96\ cm^2$

8 A **rhombus** has diagonals of **14 cm** and **10 cm**. What is its area? E2.4 · AP

- A $70\ cm^2$
- B $48\ cm^2$
- C $24\ cm^2$
- D $140\ cm^2$

9 A **kite** has diagonals of **14 cm** and **10 cm**. What is its area? E2.4 · AP

- A $70\ cm^2$
- B $24\ cm^2$
- C $48\ cm^2$
- D $140\ cm^2$

10 A **kite** has diagonals of **14 cm** and **10 cm**. What is its area? E2.4 · AP

- A $48\ cm^2$
- B $24\ cm^2$
- C $70\ cm^2$
- D $140\ cm^2$

11 A **rhombus** has diagonals of **16 cm** and **6 cm**. What is its area? E2.4 · AP

- A $48\ cm^2$
- B $22\ cm^2$
- C $44\ cm^2$
- D $96\ cm^2$

12 A **kite** has diagonals of **12 cm** and **8 cm**. What is its area? E2.4 · AP

- A $20\ cm^2$
- B $96\ cm^2$
- C $40\ cm^2$
- D $48\ cm^2$

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

NEW GROUND · SHEET 6

Composite Shapes With The Sheet

Strand E · Spatial Sense — 9 of the 44 questions (20%) · E2.4

Decompose into shapes the formula sheet already gives you, then add.

1 A sign is made of a **rectangle 12 cm by 8 cm** with a **triangle** on top (base 5 cm, height 6 cm). What is the total area? E2.4 · TH

- A $96\ cm^2$
- B $126\ cm^2$
- C $111\ cm^2$
- D $63\ cm^2$

2 A sign is made of a **rectangle 14 cm by 5 cm** with a **triangle** on top (base 8 cm, height 3 cm). What is the total area? E2.4 · TH

- A $94\ cm^2$
- B $82\ cm^2$
- C $70\ cm^2$
- D $47\ cm^2$

3 A sign is made of a **rectangle 10 cm by 6 cm** with a **triangle** on top (base 6 cm, height 4 cm). What is the total area? E2.4 · TH

- A $42\ cm^2$
- B $72\ cm^2$
- C $60\ cm^2$
- D $84\ cm^2$

4 A sign is made of a **rectangle 14 cm by 5 cm** with a **triangle** on top (base 6 cm, height 4 cm). What is the total area? E2.4 · TH

- A $70\ cm^2$
- B $82\ cm^2$
- C $94\ cm^2$
- D $47\ cm^2$

5 A sign is made of a **rectangle 14 cm by 5 cm** with a **triangle** on top (base 8 cm, height 3 cm). What is the total area? E2.4 · TH

- A $47\ cm^2$
- B $82\ cm^2$
- C $94\ cm^2$
- D $70\ cm^2$

6 A sign is made of a **rectangle 14 cm by 5 cm** with a **triangle** on top (base 8 cm, height 3 cm). What is the total area? E2.4 · TH

- A $94\ cm^2$
- B $82\ cm^2$
- C $70\ cm^2$
- D $47\ cm^2$

7 A sign is made of a **rectangle 14 cm by 5 cm** with a **triangle** on top (base 5 cm, height 6 cm). What is the total area? E2.4 · TH

- A $85\ cm^2$
- B $50\ cm^2$
- C $100\ cm^2$
- D $70\ cm^2$

8 A sign is made of a **rectangle 14 cm by 5 cm** with a **triangle** on top (base 6 cm, height 4 cm). What is the total area? E2.4 · TH

- A $94\ cm^2$
- B $47\ cm^2$
- C $82\ cm^2$
- D $70\ cm^2$

9 A sign is made of a **rectangle 12 cm by 8 cm** with a **triangle** on top (base 6 cm, height 4 cm). What is the total area? E2.4 · TH

- A $120\ cm^2$
- B $60\ cm^2$
- C $96\ cm^2$
- D $108\ cm^2$

10 A sign is made of a **rectangle 14 cm by 5 cm** with a **triangle** on top (base 5 cm, height 6 cm). What is the total area? E2.4 · TH

- A $100\ cm^2$
- B $70\ cm^2$
- C $50\ cm^2$
- D $85\ cm^2$

11 A sign is made of a **rectangle 12 cm by 8 cm** with a **triangle** on top (base 5 cm, height 6 cm). What is the total area? E2.4 · TH

- **A** 111 cm^2
- **B** 96 cm^2
- **C** 126 cm^2
- **D** 63 cm^2

12 A sign is made of a **rectangle 12 cm by 8 cm** with a **triangle** on top (base 5 cm, height 6 cm). What is the total area? E2.4 · TH

- **A** 111 cm^2
- **B** 126 cm^2
- **C** 63 cm^2
- **D** 96 cm^2

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NEW GROUND · SHEET 7

Factor Trees

Strand B · Number — 14 of the 44 questions (32%) · B2.6

Keep splitting until every branch ends on a prime. Then multiply back to check.

1 Write **180** as a product of its **prime factors.** B2.6 · AP

- A $2 \times 3 \times 5$
- B 1×180
- C $2^2 \times 3^2$
- D $2^2 \times 3^2 \times 5$

2 Write **36** as a product of its **prime factors.** B2.6 · AP

- A $2^2 \times 3^2$
- B 2^2
- C 1×36
- D 2×3

3 Write **120** as a product of its **prime factors.** B2.6 · AP

- A $2^3 \times 3$
- B $2^3 \times 3 \times 5$
- C 1×120
- D $2 \times 3 \times 5$

4 Write **90** as a product of its **prime factors.** B2.6 · AP

- A 2×3^2
- B $2 \times 3^2 \times 5$
- C 1×90
- D $2 \times 3 \times 5$

5 Write **132** as a product of its **prime factors.** B2.6 · AP

- A $2^2 \times 3 \times 11$
- B $2 \times 3 \times 11$
- C 1×132
- D $2^2 \times 3$

6 Write **132** as a product of its **prime factors.** B2.6 · AP

- A $2^2 \times 3 \times 11$
- B $2 \times 3 \times 11$
- C 1×132
- D $2^2 \times 3$

7 Write **126** as a product of its **prime factors.** B2.6 · AP

- A 1×126
- B $2 \times 3^2 \times 7$
- C $2 \times 3 \times 7$
- D 2×3^2

8 Write **150** as a product of its **prime factors.** B2.6 · AP

- A $2 \times 3 \times 5^2$
- B $2 \times 3 \times 5$
- C 2×3
- D 1×150

9 Write **210** as a product of its **prime factors.** B2.6 · AP

- A 1×210
- B $2 \times 3 \times 5$
- C 950
- D $2 \times 3 \times 5 \times 7$

10 Write **36** as a product of its **prime factors.** B2.6 · AP

- A 2×3
- B $2^2 \times 3^2$
- C 2^2
- D 1×36

11 Write **90** as a product of its **prime factors.** B2.6 · AP

- A $2 \times 3 \times 5$
- B 2×3^2
- C 1×90
- D $2 \times 3^2 \times 5$

12 Write **120** as a product of its **prime factors.** B2.6 · AP

- A $2^3 \times 3 \times 5$
- B 1×120
- C $2 \times 3 \times 5$
- D $2^3 \times 3$

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NEW GROUND · SHEET 8

Prime Or Composite

Strand B · Number — 14 of the 44 questions (32%) · B2.6

> **Test 2, 3, 5, 7, 11 and 13 as divisors. That is enough for anything under 200.**

1 Is **43** a prime number or a composite number? B2.6 · KU

- A both
- B prime
- C composite
- D neither

2 Is **13** a prime number or a composite number? B2.6 · KU

- A composite
- B neither
- C both
- D prime

3 Is **41** a prime number or a composite number? B2.6 · KU

- A neither
- B composite
- C prime
- D both

4 Is **31** a prime number or a composite number? B2.6 · KU

- A neither
- B both
- C prime
- D composite

5 Is **91** a prime number or a composite number? B2.6 · KU

- A prime
- B composite
- C neither
- D both

6 Is **23** a prime number or a composite number? B2.6 · KU

- A prime
- B composite
- C neither
- D both

7 Is **23** a prime number or a composite number? B2.6 · KU

- A both
- B composite
- C prime
- D neither

8 Is **47** a prime number or a composite number? B2.6 · KU

- A composite
- B both
- C prime
- D neither

9 Is **91** a prime number or a composite number? B2.6 · KU

- A neither
- B prime
- C composite
- D both

10 Is **43** a prime number or a composite number? B2.6 · KU

- A prime
- B neither
- C both
- D composite

11 Is **7** a prime number or a composite number? B2.6 · KU

- A both
- B prime
- C neither
- D composite

12 Is **87** a prime number or a composite number? B2.6 · KU

- A composite
- B neither
- C prime
- D both

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

NEW GROUND · SHEET 9

Rotational Symmetry

Strand E · Spatial Sense — 9 of the 44 questions (20%) · E1.1

Turn it one full circle and count how many times it looks the same. Every shape has order at least 1.

1 What is the **order of rotational symmetry** of a **equilateral triangle?** E1.1 · KU

- A 4
- B 2
- C 3
- D 5

2 What is the **order of rotational symmetry** of a **regular hexagon?** E1.1 · KU

- A 6
- B 5
- C 2
- D 4

3 What is the **order of rotational symmetry** of a **isosceles trapezoid?** E1.1 · KU

- A 1
- B 4
- C 2
- D 5

4 What is the **order of rotational symmetry** of a **regular pentagon?** E1.1 · KU

- A 4
- B 6
- C 5
- D 2

5 What is the **order of rotational symmetry** of a **kite?** E1.1 · KU

- A 1
- B 2
- C 5
- D 4

6 What is the **order of rotational symmetry** of a **rectangle?** E1.1 · KU

- A 5
- B 4
- C 6
- D 2

7 What is the **order of rotational symmetry** of a **rhombus?** E1.1 · KU

- A 6
- B 5
- C 2
- D 4

8 What is the **order of rotational symmetry** of a **rhombus?** E1.1 · KU

- A 4
- B 2
- C 6
- D 5

9 What is the **order of rotational symmetry** of a **regular hexagon?** E1.1 · KU

- A 6
- B 2
- C 5
- D 4

10 What is the **order of rotational symmetry** of a **equilateral triangle?** E1.1 · KU

- A 4
- B 5
- C 2
- D 3

11 What is the **order of rotational symmetry** of a **regular hexagon?** E1.1 · KU

- A 6
- B 2
- C 4
- D 5

12 What is the **order of rotational symmetry** of a **equilateral triangle?** E1.1 · KU

- A 3
- B 2
- C 5
- D 4

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NEW GROUND · SHEET 10

Folds And Turns Together

Strand E · Spatial Sense — 9 of the 44 questions (20%) · E1.1

Lines of symmetry are folds; rotational order is turns. A parallelogram has 0 folds but order 2.

1 Which describes a **square**? E1.1 · AP

- A 4 lines of symmetry, rotational order 4
- B 1 line of symmetry, rotational order 1
- C 2 lines of symmetry, rotational order 2
- D 0 lines of symmetry, rotational order 2

2 Which describes a **isosceles trapezoid?** E1.1 · AP

- A 0 lines of symmetry, rotational order 2
- B 4 lines of symmetry, rotational order 4
- C 1 line of symmetry, rotational order 1
- D 2 lines of symmetry, rotational order 2

3 Which describes a **isosceles trapezoid?** E1.1 · AP

- A 0 lines of symmetry, rotational order 2
- B 4 lines of symmetry, rotational order 4
- C 2 lines of symmetry, rotational order 2
- D 1 line of symmetry, rotational order 1

4 Which describes a **kite?** E1.1 · AP

- A 4 lines of symmetry, rotational order 4
- B 2 lines of symmetry, rotational order 2
- C 1 line of symmetry, rotational order 1
- D 0 lines of symmetry, rotational order 2

5 Which describes a **parallelogram?** E1.1 · AP

- A 4 lines of symmetry, rotational order 4
- B 0 lines of symmetry, rotational order 2
- C 1 line of symmetry, rotational order 1
- D 2 lines of symmetry, rotational order 2

6 Which describes a **parallelogram?** E1.1 · AP

- A 0 lines of symmetry, rotational order 2
- B 2 lines of symmetry, rotational order 2
- C 1 line of symmetry, rotational order 1
- D 4 lines of symmetry, rotational order 4

7 Which describes a **rhombus?** E1.1 · AP

- A 457
- B 2 lines of symmetry, rotational order 2
- C 4 lines of symmetry, rotational order 4
- D 0 lines of symmetry, rotational order 2

8 Which describes a **rectangle**? E1.1 · AP

- ◯ **A** 2 lines of symmetry, rotational order 2
- ◯ **B** 480
- ◯ **C** 0 lines of symmetry, rotational order 2
- ◯ **D** 4 lines of symmetry, rotational order 4

9 Which describes a **rhombus?** E1.1 · AP

- ◯ **A** 0 lines of symmetry, rotational order 2
- ◯ **B** 111
- ◯ **C** 2 lines of symmetry, rotational order 2
- ◯ **D** 4 lines of symmetry, rotational order 4

10 Which describes a **rhombus?** E1.1 · AP

- ◯ **A** 4 lines of symmetry, rotational order 4
- ◯ **B** 483
- ◯ **C** 2 lines of symmetry, rotational order 2
- ◯ **D** 0 lines of symmetry, rotational order 2

11 Which describes a **kite**? E1.1 · AP

- ◯ **A** 4 lines of symmetry, rotational order 4
- ◯ **B** 1 line of symmetry, rotational order 1
- ◯ **C** 0 lines of symmetry, rotational order 2
- ◯ **D** 2 lines of symmetry, rotational order 2

12 Which describes a **square**? E1.1 · AP

- ◯ **A** 0 lines of symmetry, rotational order 2
- ◯ **B** 1 line of symmetry, rotational order 1
- ◯ **C** 4 lines of symmetry, rotational order 4
- ◯ **D** 2 lines of symmetry, rotational order 2

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

NEW GROUND · SHEET 11

Reflections

Strand E · Spatial Sense — 9 of the 44 questions (20%) · E1.4

Reflecting in the x-axis flips the y. Reflecting in the y-axis flips the x.

1 Point **(7, 7)** is reflected in the **y-axis**. What are the new coordinates? E1.4 · AP

- A (7, 7)
- B (7, -7)
- C (-7, 7)
- D (-7, -7)

2 Point **(1, 3)** is reflected in the **x-axis**. What are the new coordinates? E1.4 · AP

- A (1, -3)
- B (-1, -3)
- C (3, 1)
- D (-1, 3)

3 Point **(5, 5)** is reflected in the **y-axis**. What are the new coordinates? E1.4 · AP

- A (-5, -5)
- B (5, 5)
- C (5, -5)
- D (-5, 5)

4 Point **(6, 6)** is reflected in the **x-axis**. What are the new coordinates? E1.4 · AP

- A (6, -6)
- B (-6, 6)
- C (6, 6)
- D (-6, -6)

5 Point **(5, 2)** is reflected in the **y-axis**. What are the new coordinates? E1.4 · AP

- A (-5, 2)
- B (-5, -2)
- C (2, 5)
- D (5, -2)

6 Point **(3, 2)** is reflected in the **x-axis**. What are the new coordinates? E1.4 · AP

- A (-3, -2)
- B (2, 3)
- C (-3, 2)
- D (3, -2)

7 Point **(6, 4)** is reflected in the **y-axis**. What are the new coordinates? E1.4 · AP

- A (-6, -4)
- B (4, 6)
- C (-6, 4)
- D (6, -4)

8 Point **(1, 6)** is reflected in the **x-axis**. What are the new coordinates? E1.4 · AP

- A (1, -6)
- B (6, 1)
- C (-1, 6)
- D (-1, -6)

9 Point **(4, 5)** is reflected in the **y-axis**. What are the new coordinates? E1.4 · AP

- A (5, 4)
- B (-4, -5)
- C (4, -5)
- D (-4, 5)

10 Point **(1, 2)** is reflected in the **y-axis**. What are the new coordinates? E1.4 · AP

- A (1, -2)
- B (-1, -2)
- C (2, 1)
- D (-1, 2)

11 Point **(7, 5)** is reflected in the **y-axis**. What are the new coordinates? E1.4 · AP

- A (5, 7)
- B (-7, 5)
- C (7, -5)
- D (-7, -5)

12 Point **(8, 5)** is reflected in the **y-axis**. What are the new coordinates? E1.4 · AP

- A (-8, 5)
- B (8, -5)
- C (5, 8)
- D (-8, -5)

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

NEW GROUND · SHEET 12

Combinations Of Transformations

Strand E · Spatial Sense — 9 of the 44 questions (20%) · E1.4

One at a time, on grid paper. Two identical reflections always undo each other.

1 A shape undergoes **a reflection in the x-axis then another reflection in the x-axis**. What is the result? E1.4 · TH

- **A** the shape is on the other side, 3 units from where it started
- **B** the same result as a single reflection in the x-axis
- **C** the shape is back exactly where it started
- **D** the shape has been enlarged

2 A shape undergoes **a translation 3 right then a reflection in the y-axis**. What is the result? E1.4 · TH

- **A** the same result as a single reflection in the x-axis
- **B** the shape is on the other side, 3 units from where it started
- **C** the shape has been enlarged
- **D** the shape is back exactly where it started

3 A shape undergoes **a reflection in the y-axis then a rotation of 180° about the origin**. What is the result? E1.4 · TH

- **A** the shape is on the other side, 3 units from where it started
- **B** the shape has been enlarged
- **C** the same result as a single reflection in the x-axis
- **D** the shape is back exactly where it started

4 A shape undergoes **a reflection in the y-axis then a rotation of 180° about the origin**. What is the result? E1.4 · TH

- **A** the same result as a single reflection in the x-axis
- **B** the shape is back exactly where it started
- **C** the shape has been enlarged
- **D** the shape is on the other side, 3 units from where it started

5 A shape undergoes **a reflection in the y-axis then a rotation of 180° about the origin**. What is the result? E1.4 · TH

- **A** the shape has been enlarged
- **B** the shape is on the other side, 3 units from where it started
- **C** the same result as a single reflection in the x-axis
- **D** the shape is back exactly where it started

6 A shape undergoes **a translation 3 right then a reflection in the y-axis**. What is the result? E1.4 · TH

- **A** the shape is back exactly where it started
- **B** the shape has been enlarged
- **C** the shape is on the other side, 3 units from where it started
- **D** the same result as a single reflection in the x-axis

7 A shape undergoes **a rotation of 180° then another rotation of 180°**. What is the result? E1.4 · TH

- **A** the shape is back exactly where it started
- **B** the shape has been enlarged
- **C** the same result as a single reflection in the x-axis
- **D** the shape is on the other side, 3 units from where it started

8 A shape undergoes **a reflection in the x-axis then another reflection in the x-axis.** What is the result? E1.4 · TH

- **A** the shape is on the other side, 3 units from where it started
- **B** the same result as a single reflection in the x-axis
- **C** the shape has been enlarged
- **D** the shape is back exactly where it started

9 A shape undergoes **a rotation of 180° then another rotation of 180°.** What is the result? E1.4 · TH

- **A** the shape is on the other side, 3 units from where it started
- **B** the same result as a single reflection in the x-axis
- **C** the shape has been enlarged
- **D** the shape is back exactly where it started

10 A shape undergoes **a translation 3 right then a reflection in the y-axis.** What is the result? E1.4 · TH

- **A** the shape has been enlarged
- **B** the same result as a single reflection in the x-axis
- **C** the shape is back exactly where it started
- **D** the shape is on the other side, 3 units from where it started

11 A shape undergoes **a translation 3 right then a reflection in the y-axis.** What is the result? E1.4 · TH

- **A** the shape has been enlarged
- **B** the shape is on the other side, 3 units from where it started
- **C** the same result as a single reflection in the x-axis
- **D** the shape is back exactly where it started

12 A shape undergoes **a translation 3 right then a reflection in the y-axis.** What is the result? E1.4 · TH

- **A** the shape has been enlarged
- **B** the shape is back exactly where it started
- **C** the same result as a single reflection in the x-axis
- **D** the shape is on the other side, 3 units from where it started

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NEW GROUND · SHEET 13

Stem-And-Leaf Plots

Strand D · Data — 8 of the 44 questions (18%) · D1.3

The stem is the tens digit, each leaf is a ones digit. The data is already in order.

1 A stem-and-leaf plot shows:
2 | 0 2 6 7 9
What is the **largest** value? D1.3 · KU

- A 2
- B 9
- C 29
- D 20

2 A stem-and-leaf plot shows:
4 | 0 1 4 6 8
What is the **largest** value? D1.3 · KU

- A 4
- B 48
- C 40
- D 8

3 A stem-and-leaf plot shows:
4 | 0 2 5 6
What is the **median**? D1.3 · AP

- A 43.5
- B 46
- C 202
- D 40

4 A stem-and-leaf plot shows:
2 | 2 3 4 5 8
How many values are in the data set? D1.3 · KU

- A 6
- B 2
- C 22
- D 5

5 A stem-and-leaf plot shows:
3 | 1 4 5 6 9
How many values are in the data set? D1.3 · KU

- A 6
- B 25
- C 5
- D 3

6 A stem-and-leaf plot shows:
4 | 3 4 7 9
What is the **median**? D1.3 · AP

- A 49
- B 43
- C 40
- D 45.5

7 A stem-and-leaf plot shows:
5 | 0 1 2 3 4
How many values are in the data set? D1.3 · KU

- A 10
- B 5
- C 6
- D 622

8 A stem-and-leaf plot shows:
4 | 0 1 7 8 9
How many values are in the data set? D1.3 · KU

- A 6
- B 5
- C 4
- D 25

9 A stem-and-leaf plot shows:

5 | 2 4 6 9

What is the **median**? D1.3 · AP

- A 59
- B 52
- C 50
- D 55

10 A stem-and-leaf plot shows:

4 | 1 4 5 6

What is the **median**? D1.3 · AP

- A 46
- B 40
- C 41
- D 44.5

11 A stem-and-leaf plot shows:

3 | 2 3 6 8 9

How many values are in the data set? D1.3 · KU

- A 5
- B 28
- C 6
- D 3

12 A stem-and-leaf plot shows:

3 | 1 2 7 8 9

What is the **largest** value? D1.3 · KU

- A 39
- B 9
- C 31
- D 3

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

NEW GROUND · SHEET 14

Line Plots And Tally Tables

Strand D · Data — 8 of the 44 questions (18%) · D1.3

Three more displays that are in the official glossary, so three more that can turn up.

1 Which display **stacks an X above each value on a number line, so the shape of the data shows?** D1.3 · KU

- A line plot
- B tally table
- C histogram
- D frequency table

2 Which display **stacks an X above each value on a number line, so the shape of the data shows?** D1.3 · KU

- A frequency table
- B tally table
- C line plot
- D histogram

3 Which display **stacks an X above each value on a number line, so the shape of the data shows?** D1.3 · KU

- A frequency table
- B tally table
- C histogram
- D line plot

4 Which display **stacks an X above each value on a number line, so the shape of the data shows?** D1.3 · KU

- A tally table
- B frequency table
- C histogram
- D line plot

5 Which display **lists each value or interval beside how many times it occurred?** D1.3 · KU

- A histogram
- B frequency table
- C tally table
- D line plot

6 Which display **lists each value or interval beside how many times it occurred?** D1.3 · KU

- A histogram
- B frequency table
- C tally table
- D line plot

7 Which display **records each observation with a stroke, grouped in fives?** D1.3 · KU

- A tally table
- B frequency table
- C line plot
- D histogram

8 Which display **lists each value or interval beside how many times it occurred?** D1.3 · KU

- A histogram
- B tally table
- C frequency table
- D line plot

9 Which display **stacks an X above each value on a number line, so the shape of the data shows?** D1.3 · KU

- A tally table
- B line plot
- C frequency table
- D histogram

10 Which display **lists each value or interval beside how many times it occurred?** D1.3 · KU

- A tally table
- B frequency table
- C line plot
- D histogram

11 Which display **lists each value or interval beside how many times it occurred?** D1.3 · KU

- A frequency table
- B line plot
- C tally table
- D histogram

12 Which display **records each observation with a stroke, grouped in fives?** D1.3 · KU

- A histogram
- B line plot
- C frequency table
- D tally table

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NEW GROUND · SHEET 15

Samples And Infographics

Strand D · Data — 8 of the 44 questions (18%) · D1.2 · D1.4

A sample only works if it represents the whole population.

1 A class surveys the school by **asking every tenth student leaving the library**. What is that? D1.2 · AP

- A the whole population, not a sample
- B a random sample of library users
- C 689
- D a biased sample

2 What is an **infographic** meant to do with a data set? D1.4 · KU

- A replace the need for any titles, labels or sources
- B tell a story about the data using graphs, numbers and other relevant information together
- C show every single data value in a long table
- D make the data look more impressive than it is

3 A class surveys the school by **asking every student in the school**. What is that? D1.2 · AP

- A the whole population, not a sample
- B a biased sample
- C 114
- D a random sample of library users

4 What is an **infographic** meant to do with a data set? D1.4 · KU

- A tell a story about the data using graphs, numbers and other relevant information together
- B replace the need for any titles, labels or sources
- C show every single data value in a long table
- D make the data look more impressive than it is

5 A class surveys the school by **asking every tenth student leaving the library**. What is that? D1.2 · AP

- A 507
- B a random sample of library users
- C a biased sample
- D the whole population, not a sample

6 What is an **infographic** meant to do with a data set? D1.4 · KU

- A make the data look more impressive than it is
- B show every single data value in a long table
- C tell a story about the data using graphs, numbers and other relevant information together
- D replace the need for any titles, labels or sources

7 A class surveys the school by **asking every tenth student leaving the library**. What is that? D1.2 · AP

- A the whole population, not a sample
- B 376
- C a biased sample
- D a random sample of library users

8 What is an **infographic** meant to do with a data set? D1.4 · KU

- ◯ **A** tell a story about the data using graphs, numbers and other relevant information together
- ◯ **B** show every single data value in a long table
- ◯ **C** replace the need for any titles, labels or sources
- ◯ **D** make the data look more impressive than it is

9 A class surveys the school by **asking only your own friends**. What is that? D1.2 · AP

- ◯ **A** a biased sample
- ◯ **B** the whole population, not a sample
- ◯ **C** 497
- ◯ **D** a random sample of library users

10 What is an **infographic** meant to do with a data set? D1.4 · KU

- ◯ **A** make the data look more impressive than it is
- ◯ **B** show every single data value in a long table
- ◯ **C** tell a story about the data using graphs, numbers and other relevant information together
- ◯ **D** replace the need for any titles, labels or sources

11 A class surveys the school by **asking only students who already play an instrument whether music should be compulsory**. What is that? D1.2 · AP

- ◯ **A** a random sample of library users
- ◯ **B** 983
- ◯ **C** a biased sample
- ◯ **D** the whole population, not a sample

12 What is an **infographic** meant to do with a data set? D1.4 · KU

- ◯ **A** show every single data value in a long table
- ◯ **B** replace the need for any titles, labels or sources
- ◯ **C** make the data look more impressive than it is
- ◯ **D** tell a story about the data using graphs, numbers and other relevant information together

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NEW GROUND · SHEET 16

Experimental Versus Theoretical

Strand D · Data — 8 of the 44 questions (18%) · D2.2

Theoretical comes from the design. Experimental comes from what actually happened.

1 A 6-sided spinner is spun **40** times and lands on red **7** times. What is the **experimental** probability of red? D2.2 · AP

- A 7/40
- B 40/7
- C 1/6
- D 7/6

2 A fair 6-section spinner has one red section. What is the **theoretical** probability of red? D2.2 · KU

- A 1/100
- B 6/1
- C 18/100
- D 1/6

3 A 6-sided spinner is spun **20** times and lands on red **4** times. What is the **experimental** probability of red? D2.2 · AP

- A 1/6
- B 4/20
- C 20/4
- D 4/6

4 After **20** spins the experimental probability is **1/20**, but the theoretical probability is **1/6**. Why are they different? D2.2 · TH

- A Experimental probability is always larger
- B The theoretical probability was worked out wrongly
- C The spinner must be unfair
- D Random variation — a finite number of trials rarely matches the theory exactly

5 After **50** spins the experimental probability is **26/50**, but the theoretical probability is **1/2**. Why are they different? D2.2 · TH

- A The theoretical probability was worked out wrongly
- B Random variation — a finite number of trials rarely matches the theory exactly
- C The spinner must be unfair
- D Experimental probability is always larger

6 A 6-sided spinner is spun **50** times and lands on red **9** times. What is the **experimental** probability of red? D2.2 · AP

- A 1/6
- B 9/6
- C 9/50
- D 50/9

7 A fair 2-section spinner has one red section. What is the **theoretical** probability of red? D2.2 · KU

- A 1/50
- B 1/2
- C 19/50
- D 2/1

8 A 2-sided spinner is spun **50** times and lands on red **31** times. What is the **experimental** probability of red? D2.2 · AP

- A 1/2
- B 31/2
- C 50/31
- D 31/50

9 A fair 4-section spinner has one red section. What is the **theoretical** probability of red? D2.2 · KU

- A 1/100
- B 23/100
- C 4/1
- D 1/4

10 A 6-sided spinner is spun **50** times and lands on red **13** times. What is the **experimental** probability of red? D2.2 · AP

- A 1/6
- B 13/6
- C 50/13
- D 13/50

11 A fair 2-section spinner has one red section. What is the **theoretical** probability of red? D2.2 · KU

- **A** 1/2
- **B** 54/100
- **C** 1/100
- **D** 2/1

12 A 4-sided spinner is spun **20** times and lands on red **7** times. What is the **experimental** probability of red? D2.2 · AP

- **A** 1/4
- **B** 7/20
- **C** 20/7
- **D** 7/4

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

Efficient Code

Strand C · Algebra — 9 of the 44 questions (20%) · C3.2

The expectation says 'and the efficiency of the code'. A loop is the efficient form.

1 Two programs both add **5** to a total **6** times.
Program A writes `add 5 to total` out 6 separate times.
Program B writes `repeat 6 times: add 5 to total`.
Which is more **efficient**, and why? C3.2 · TH

- **A** Program A — loops always run more slowly
- **B** They are equally efficient because the answer is the same
- **C** Program A — more lines means more gets done
- **D** Program B — it uses a loop, so fewer lines do the same work

2 Two programs both add **10** to a total **10** times.
Program A writes `add 10 to total` out 10 separate times.
Program B writes `repeat 10 times: add 10 to total`.
Which is more **efficient**, and why? C3.2 · TH

- **A** Program B — it uses a loop, so fewer lines do the same work
- **B** Program A — more lines means more gets done
- **C** They are equally efficient because the answer is the same
- **D** Program A — loops always run more slowly

3 Two programs both add **10** to a total **6** times.
Program A writes `add 10 to total` out 6 separate times.
Program B writes `repeat 6 times: add 10 to total`.
Which is more **efficient**, and why? C3.2 · TH

- **A** They are equally efficient because the answer is the same
- **B** Program A — more lines means more gets done
- **C** Program B — it uses a loop, so fewer lines do the same work
- **D** Program A — loops always run more slowly

4 Two programs both add **5** to a total **5** times.
Program A writes `add 5 to total` out 5 separate times.
Program B writes `repeat 5 times: add 5 to total`.
Which is more **efficient**, and why? C3.2 · TH

- **A** Program A — loops always run more slowly
- **B** Program B — it uses a loop, so fewer lines do the same work
- **C** Program A — more lines means more gets done
- **D** They are equally efficient because the answer is the same

5 Two programs both add **3** to a total **10** times.
Program A writes `add 3 to total` out 10 separate times.
Program B writes `repeat 10 times: add 3 to total`.
Which is more **efficient**, and why? C3.2 · TH

- **A** Program A — loops always run more slowly
- **B** Program B — it uses a loop, so fewer lines do the same work
- **C** They are equally efficient because the answer is the same
- **D** Program A — more lines means more gets done

6 Two programs both add **10** to a total **4** times.
Program A writes `add 10 to total` out 4 separate times.
Program B writes `repeat 4 times: add 10 to total`.
Which is more **efficient**, and why? C3.2 · TH

- A They are equally efficient because the answer is the same
- B Program A — loops always run more slowly
- C Program B — it uses a loop, so fewer lines do the same work
- D Program A — more lines means more gets done

7 Two programs both add **10** to a total **10** times.
Program A writes `add 10 to total` out 10 separate times.
Program B writes `repeat 10 times: add 10 to total`.
Which is more **efficient**, and why? C3.2 · TH

- A They are equally efficient because the answer is the same
- B Program A — more lines means more gets done
- C Program A — loops always run more slowly
- D Program B — it uses a loop, so fewer lines do the same work

8 Two programs both add **5** to a total **5** times.
Program A writes `add 5 to total` out 5 separate times.
Program B writes `repeat 5 times: add 5 to total`.
Which is more **efficient**, and why? C3.2 · TH

- A They are equally efficient because the answer is the same
- B Program A — more lines means more gets done
- C Program A — loops always run more slowly
- D Program B — it uses a loop, so fewer lines do the same work

9 Two programs both add **3** to a total **6** times.
Program A writes `add 3 to total` out 6 separate times.
Program B writes `repeat 6 times: add 3 to total`.
Which is more **efficient**, and why? C3.2 · TH

- A Program B — it uses a loop, so fewer lines do the same work
- B Program A — loops always run more slowly
- C Program A — more lines means more gets done
- D They are equally efficient because the answer is the same

10 Two programs both add **5** to a total **4** times.
Program A writes `add 5 to total` out 4 separate times.
Program B writes `repeat 4 times: add 5 to total`.
Which is more **efficient**, and why? C3.2 · TH

- A Program A — loops always run more slowly
- B Program B — it uses a loop, so fewer lines do the same work
- C They are equally efficient because the answer is the same
- D Program A — more lines means more gets done

11 Two programs both add **10** to a total **6** times.
Program A writes `add 10 to total` out 6 separate times.
Program B writes `repeat 6 times: add 10 to total`.
Which is more **efficient**, and why? C3.2 · TH

- A Program A — more lines means more gets done
- B They are equally efficient because the answer is the same
- C Program A — loops always run more slowly
- D Program B — it uses a loop, so fewer lines do the same work

12 Two programs both add **3** to a total **5** times.
Program A writes `add 3 to total` out 5 separate times.
Program B writes `repeat 5 times: add 3 to total`.
Which is more **efficient**, and why? C3.2 · TH

- ○ **A** Program B — it uses a loop, so fewer lines do the same work
- ○ **B** Program A — loops always run more slowly
- ○ **C** They are equally efficient because the answer is the same
- ○ **D** Program A — more lines means more gets done

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NEW GROUND · SHEET 18

Reading And Altering Code

Strand C · Algebra — 9 of the 44 questions (20%) · C3.2

Change one number and predict the new outcome. Trace it line by line.

1
```
set total to 2
repeat 8 times
  add 2 to total
end repeat
```
The **8** is changed to **11**. What is the new total? C3.2 · AP

- A 26
- B 18
- C 22
- D 24

2
```
set total to 9
repeat 6 times
  add 5 to total
end repeat
```
The **6** is changed to **7**. What is the new total? C3.2 · AP

- A 49
- B 35
- C 44
- D 39

3
```
set total to 8
repeat 5 times
  add 3 to total
end repeat
```
The **5** is changed to **6**. What is the new total? C3.2 · AP

- A 29
- B 26
- C 18
- D 23

4
```
set total to 7
repeat 7 times
  add 2 to total
end repeat
```
The **7** is changed to **10**. What is the new total? C3.2 · AP

- A 20
- B 21
- C 29
- D 27

5
```
set total to 0
repeat 8 times
  add 5 to total
end repeat
```
The **8** is changed to **9**. What is the new total? C3.2 · AP

- A 40
- B 296
- C 50
- D 45

6
```
set total to 3
repeat 3 times
  add 3 to total
end repeat
```
The **3** is changed to **5**. What is the new total? C3.2 · AP

- A 18
- B 15
- C 12
- D 21

7
```
set total to 9
repeat 7 times
  add 2 to total
end repeat
```
The **7** is changed to **8**. What is the new total? C3.2 · AP

- A 16
- B 25
- C 23
- D 27

8
```
set total to 5
repeat 7 times
  add 3 to total
end repeat
```
The **7** is changed to **10**. What is the new total? C3.2 · AP

- A 35
- B 26
- C 30
- D 38

9
```
set total to 8
repeat 8 times
  add 5 to total
end repeat
```
The **8** is changed to **12**. What is the new total? C3.2 · AP

- A 60
- B 68
- C 73
- D 48

10
```
set total to 0
repeat 5 times
  add 3 to total
end repeat
```
The **5** is changed to **9**. What is the new total? C3.2 · AP

- A 30
- B 15
- C 719
- D 27

11
```
set total to 10
repeat 7 times
  add 5 to total
end repeat
```
The **7** is changed to **11**. What is the new total? C3.2 · AP

- A 65
- B 45
- C 70
- D 55

12
```
set total to 4
repeat 8 times
  add 2 to total
end repeat
```
The **8** is changed to **11**. What is the new total? C3.2 · AP

- A 28
- B 22
- C 20
- D 26

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

NEW GROUND · SHEET 19

Discounts

Strand F · Financial Literacy — 4 of the 44 questions (9%) · F1.1

Work out the discount, then SUBTRACT it. Answering with the discount is the trap.

1 A tool costs **$60** and is on sale at **10% off**. What is the sale price? F1.1 · AP

- A $54
- B $50
- C $66
- D $6

2 A tool costs **$150** and is on sale at **20% off**. What is the sale price? F1.1 · AP

- A $180
- B $130
- C $120
- D $30

3 A tool costs **$200** and is on sale at **15% off**. What is the sale price? F1.1 · AP

- A $185
- B $30
- C $230
- D $170

4 A tool costs **$40** and is on sale at **25% off**. What is the sale price? F1.1 · AP

- A $30
- B $10
- C $50
- D $15

5 A tool costs **$60** and is on sale at **20% off**. What is the sale price? F1.1 · AP

- A $48
- B $12
- C $40
- D $72

6 A tool costs **$150** and is on sale at **10% off**. What is the sale price? F1.1 · AP

- A $135
- B $140
- C $15
- D $165

7 A tool costs **$150** and is on sale at **50% off**. What is the sale price? F1.1 · AP

- A 548
- B $225
- C $100
- D $75

8 A tool costs **$150** and is on sale at **25% off**. What is the sale price? F1.1 · AP

- A $113
- B $37
- C $187
- D $125

9 A tool costs **$200** and is on sale at **50% off**. What is the sale price? F1.1 · AP

- A $100
- B $150
- C 713
- D $300

10 A tool costs **$80** and is on sale at **50% off**. What is the sale price? F1.1 · AP

- A $120
- B $40
- C $30
- D 474

11 A tool costs **$150** and is on sale at **10% off**. What is the sale price? F1.1 · AP

- A $135
- B $15
- C $165
- D $140

12 A tool costs **$80** and is on sale at **25% off**. What is the sale price? F1.1 · AP

- A $60
- B $20
- C $55
- D $100

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

NEW GROUND · SHEET 20

Accounts, Loans And Mortgages

Strand F · Financial Literacy — 4 of the 44 questions (9%) · F1.4

Five financial words from the glossary that Volume 1 never touched.

1 What is **a mortgage?** F1.4 · KU

- A is a long-term loan used to buy property
- B is for everyday spending, and usually pays little or no interest
- C usually pays interest to you, but is meant for money you leave alone
- D is money borrowed that must be repaid, usually with interest

2 Which of these **is money borrowed that must be repaid, usually with interest?** F1.4 · KU

- A a savings account
- B a chequing account
- C a loan
- D a mortgage

3 What is **a loan?** F1.4 · KU

- A is a long-term loan used to buy property
- B is money borrowed that must be repaid, usually with interest
- C is for everyday spending, and usually pays little or no interest
- D usually pays interest to you, but is meant for money you leave alone

4 What is **a savings account?** F1.4 · KU

- A usually pays interest to you, but is meant for money you leave alone
- B is a long-term loan used to buy property
- C is for everyday spending, and usually pays little or no interest
- D is money borrowed that must be repaid, usually with interest

5 What is **a chequing account?** F1.4 · KU

- A is for everyday spending, and usually pays little or no interest
- B is a long-term loan used to buy property
- C is money borrowed that must be repaid, usually with interest
- D usually pays interest to you, but is meant for money you leave alone

6 What is **a loan?** F1.4 · KU

- A usually pays interest to you, but is meant for money you leave alone
- B is money borrowed that must be repaid, usually with interest
- C is a long-term loan used to buy property
- D is for everyday spending, and usually pays little or no interest

7 Which of these **usually pays interest to you, but is meant for money you leave alone?** F1.4 · KU

- A a loan
- B a chequing account
- C a mortgage
- D a savings account

8 What is **a chequing account?** F1.4 · KU

- A usually pays interest to you, but is meant for money you leave alone
- B is money borrowed that must be repaid, usually with interest
- C is for everyday spending, and usually pays little or no interest
- D is a long-term loan used to buy property

9 Which of these **usually pays interest to you, but is meant for money you leave alone?** F1.4 · KU

- A a savings account
- B a loan
- C a mortgage
- D a chequing account

10 What is **a mortgage**? F1.4 · KU

- ○ **A** is a long-term loan used to buy property
- ○ **B** is for everyday spending, and usually pays little or no interest
- ○ **C** is money borrowed that must be repaid, usually with interest
- ○ **D** usually pays interest to you, but is meant for money you leave alone

11 What is **a mortgage**? F1.4 · KU

- ○ **A** is for everyday spending, and usually pays little or no interest
- ○ **B** is a long-term loan used to buy property
- ○ **C** usually pays interest to you, but is meant for money you leave alone
- ○ **D** is money borrowed that must be repaid, usually with interest

12 What is **a loan**? F1.4 · KU

- ○ **A** is for everyday spending, and usually pays little or no interest
- ○ **B** is money borrowed that must be repaid, usually with interest
- ○ **C** is a long-term loan used to buy property
- ○ **D** usually pays interest to you, but is meant for money you leave alone

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

Income, Fees And Budgets

Strand F · Financial Literacy — 4 of the 44 questions (9%) · F1.2

Money in, money out, and what the bank takes on the way past.

1 Which term means **charges a bank or service makes for using an account or a card?** F1.2 · KU

- A interest earned
- B fees
- C budget
- D income

2 Which term means **money coming in, from work or other sources?** F1.2 · KU

- A interest earned
- B fees
- C income
- D budget

3 Which term means **money coming in, from work or other sources?** F1.2 · KU

- A income
- B budget
- C fees
- D interest earned

4 Which term means **money coming in, from work or other sources?** F1.2 · KU

- A fees
- B budget
- C income
- D interest earned

5 Which term means **money coming in, from work or other sources?** F1.2 · KU

- A income
- B interest earned
- C budget
- D fees

6 Which term means **charges a bank or service makes for using an account or a card?** F1.2 · KU

- A income
- B fees
- C budget
- D interest earned

7 Which term means **money a bank pays you for keeping savings with them?** F1.2 · KU

- A fees
- B budget
- C interest earned
- D income

8 Which term means **money a bank pays you for keeping savings with them?** F1.2 · KU

- A budget
- B income
- C fees
- D interest earned

9 Which term means **money a bank pays you for keeping savings with them?** F1.2 · KU

- A income
- B interest earned
- C budget
- D fees

10 Which term means **a plan for what money comes in and where it goes?** F1.2 · KU

- A interest earned
- B fees
- C income
- D budget

11 Which term means **money coming in, from work or other sources?** F1.2 · KU

- A income
- B fees
- C budget
- D interest earned

12 Which term means **charges a bank or service makes for using an account or a card?** F1.2 · KU

- A fees
- B budget
- C income
- D interest earned

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

NEW GROUND · SHEET 22

Comparing Interest Rates

Strand F · Financial Literacy — 4 of the 44 questions (9%) · F1.4

Low rate is better when borrowing. High rate is better when saving. Know which you are doing.

1 You need to **borrow $1500** for 2 years. One lender charges **4%** simple interest, another charges **2%**. Which costs less, and by how much? F1.4 · TH

- A 2%, by $2
- B They cost the same
- C 4%, by $60
- D 2%, by $60

2 You need to **borrow $1500** for 2 years. One lender charges **6%** simple interest, another charges **5%**. Which costs less, and by how much? F1.4 · TH

- A They cost the same
- B 5%, by $30
- C 5%, by $1
- D 6%, by $30

3 You need to **borrow $2000** for 2 years. One lender charges **4%** simple interest, another charges **8%**. Which costs less, and by how much? F1.4 · TH

- A 4%, by $160
- B 8%, by $160
- C They cost the same
- D 4%, by $4

4 You need to **borrow $800** for 2 years. One lender charges **8%** simple interest, another charges **2%**. Which costs less, and by how much? F1.4 · TH

- A They cost the same
- B 2%, by $6
- C 8%, by $96
- D 2%, by $96

5 You need to **borrow $2000** for 1 year. One lender charges **4%** simple interest, another charges **5%**. Which costs less, and by how much? F1.4 · TH

- A 5%, by $20
- B They cost the same
- C 4%, by $20
- D 4%, by $1

6 You need to **borrow $500** for 1 year. One lender charges **6%** simple interest, another charges **5%**. Which costs less, and by how much? F1.4 · TH

- A 5%, by $1
- B 5%, by $5
- C 6%, by $5
- D They cost the same

7 You need to **borrow $1000** for 1 year. One lender charges **4%** simple interest, another charges **6%**. Which costs less, and by how much? F1.4 · TH

- A 4%, by $2
- B 4%, by $20
- C 6%, by $20
- D They cost the same

8 You need to **borrow $500** for 1 year. One lender charges **8%** simple interest, another charges **3%**. Which costs less, and by how much? F1.4 · TH

- A 8%, by $25
- B 3%, by $5
- C 3%, by $25
- D They cost the same

9 You need to **borrow $1000** for 1 year. One lender charges **2%** simple interest, another charges **5%**. Which costs less, and by how much? F1.4 · TH

- A They cost the same
- B 2%, by $30
- C 2%, by $3
- D 5%, by $30

10 You need to **borrow $1500** for 1 year. One lender charges **8%** simple interest, another charges **3%**. Which costs less, and by how much? F1.4 · TH

- A 8%, by $75
- B 3%, by $5
- C They cost the same
- D 3%, by $75

11 You need to **borrow $2000** for 1 year. One lender charges **2%** simple interest, another charges **8%**. Which costs less, and by how much? F1.4 · TH

- A 2%, by $6
- B 8%, by $120
- C 2%, by $120
- D They cost the same

12 You need to **borrow $2000** for 2 years. One lender charges **6%** simple interest, another charges **5%**. Which costs less, and by how much? F1.4 · TH

- A 5%, by $1
- B 6%, by $40
- C 5%, by $40
- D They cost the same

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

Expanded Form

Strand B · Number — 14 of the 44 questions (32%) · B1.1

Each digit multiplied by its place value, added together. Zeros contribute nothing.

1 Write **190 081** in **expanded form.** B1.1 · KU

- **A** 1 × 1 + 8 × 10 + 9 × 10 000 + 1 × 100 000
- **B** 1 × 100 000 + 9 × 10 000 + 8 × 10
- **C** 1 × 100 000 × 9 × 10 000 × 8 × 10 × 1 × 1
- **D** 1 × 100 000 + 9 × 10 000 + 8 × 10 + 1 × 1

2 Write **820 955** in **expanded form.** B1.1 · KU

- **A** 8 × 100 000 + 2 × 10 000 + 9 × 100 + 5 × 10
- **B** 8 × 100 000 + 2 × 10 000 + 9 × 100 + 5 × 10 + 5 × 1
- **C** 5 × 1 + 5 × 10 + 9 × 100 + 2 × 10 000 + 8 × 100 000
- **D** 8 × 100 000 × 2 × 10 000 × 9 × 100 × 5 × 10 × 5 × 1

3 Write **898 386** in **expanded form.** B1.1 · KU

- **A** 8 × 100 000 + 9 × 10 000 + 8 × 1000 + 3 × 100 + 8 × 10
- **B** 8 × 100 000 + 9 × 10 000 + 8 × 1000 + 3 × 100 + 8 × 10 + 6 × 1
- **C** 6 × 1 + 8 × 10 + 3 × 100 + 8 × 1000 + 9 × 10 000 + 8 × 100 000
- **D** 8 × 100 000 × 9 × 10 000 × 8 × 1000 × 3 × 100 × 8 × 10 × 6 × 1

4 Write **879 078** in **expanded form.** B1.1 · KU

- **A** 8 × 1 + 7 × 10 + 9 × 1000 + 7 × 10 000 + 8 × 100 000
- **B** 8 × 100 000 × 7 × 10 000 × 9 × 1000 × 7 × 10 × 8 × 1
- **C** 8 × 100 000 + 7 × 10 000 + 9 × 1000 + 7 × 10
- **D** 8 × 100 000 + 7 × 10 000 + 9 × 1000 + 7 × 10 + 8 × 1

5 Write **397 321** in **expanded form.** B1.1 · KU

- **A** 3 × 100 000 + 9 × 10 000 + 7 × 1000 + 3 × 100 + 2 × 10
- **B** 3 × 100 000 × 9 × 10 000 × 7 × 1000 × 3 × 100 × 2 × 10 × 1 × 1
- **C** 3 × 100 000 + 9 × 10 000 + 7 × 1000 + 3 × 100 + 2 × 10 + 1 × 1
- **D** 1 × 1 + 2 × 10 + 3 × 100 + 7 × 1000 + 9 × 10 000 + 3 × 100 000

6 Write **181 510** in **expanded form.** B1.1 · KU

- **A** 1 × 100 000 + 8 × 10 000 + 1 × 1000 + 5 × 100
- **B** 1 × 100 000 + 8 × 10 000 + 1 × 1000 + 5 × 100 + 1 × 10
- **C** 1 × 10 + 5 × 100 + 1 × 1000 + 8 × 10 000 + 1 × 100 000
- **D** 1 × 100 000 × 8 × 10 000 × 1 × 1000 × 5 × 100 × 1 × 10

7 Write **910 050** in **expanded form.** B1.1 · KU

- **A** 9 × 100 000 × 1 × 10 000 × 5 × 10
- **B** 9 × 100 000 + 1 × 10 000 + 5 × 10
- **C** 9 × 100 000 + 1 × 10 000
- **D** 5 × 10 + 1 × 10 000 + 9 × 100 000

8 Write **42 228** in **expanded form.** B1.1 · KU

- ○ **A** 8 × 1 + 2 × 10 + 2 × 100 + 2 × 1000 + 4 × 10 000
- ○ **B** 4 × 10 000 × 2 × 1000 × 2 × 100 × 2 × 10 × 8 × 1
- ○ **C** 4 × 10 000 + 2 × 1000 + 2 × 100 + 2 × 10 + 8 × 1
- ○ **D** 4 × 10 000 + 2 × 1000 + 2 × 100 + 2 × 10

9 Write **159 608** in **expanded form.** B1.1 · KU

- ○ **A** 1 × 100 000 × 5 × 10 000 × 9 × 1000 × 6 × 100 × 8 × 1
- ○ **B** 1 × 100 000 + 5 × 10 000 + 9 × 1000 + 6 × 100 + 8 × 1
- ○ **C** 8 × 1 + 6 × 100 + 9 × 1000 + 5 × 10 000 + 1 × 100 000
- ○ **D** 1 × 100 000 + 5 × 10 000 + 9 × 1000 + 6 × 100

10 Write **897 367** in **expanded form.** B1.1 · KU

- ○ **A** 8 × 100 000 + 9 × 10 000 + 7 × 1000 + 3 × 100 + 6 × 10 + 7 × 1
- ○ **B** 8 × 100 000 × 9 × 10 000 × 7 × 1000 × 3 × 100 × 6 × 10 × 7 × 1
- ○ **C** 7 × 1 + 6 × 10 + 3 × 100 + 7 × 1000 + 9 × 10 000 + 8 × 100 000
- ○ **D** 8 × 100 000 + 9 × 10 000 + 7 × 1000 + 3 × 100 + 6 × 10

11 Write **649 873** in **expanded form.** B1.1 · KU

- ○ **A** 3 × 1 + 7 × 10 + 8 × 100 + 9 × 1000 + 4 × 10 000 + 6 × 100 000
- ○ **B** 6 × 100 000 + 4 × 10 000 + 9 × 1000 + 8 × 100 + 7 × 10
- ○ **C** 6 × 100 000 × 4 × 10 000 × 9 × 1000 × 8 × 100 × 7 × 10 × 3 × 1
- ○ **D** 6 × 100 000 + 4 × 10 000 + 9 × 1000 + 8 × 100 + 7 × 10 + 3 × 1

12 Write **574 906** in **expanded form.** B1.1 · KU

- ○ **A** 5 × 100 000 × 7 × 10 000 × 4 × 1000 × 9 × 100 × 6 × 1
- ○ **B** 6 × 1 + 9 × 100 + 4 × 1000 + 7 × 10 000 + 5 × 100 000
- ○ **C** 5 × 100 000 + 7 × 10 000 + 4 × 1000 + 9 × 100 + 6 × 1
- ○ **D** 5 × 100 000 + 7 × 10 000 + 4 × 1000 + 9 × 100

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

Mixed Number Review

Strand B · Number — 14 of the 44 questions (32%) · B1.3 · B2.12 · B2.5

The three Number topics the released data flags hardest, revisited.

1 Order these from **least to greatest**: **0.2 · −1 · 1/2 · 3/4** B1.3 · AP

- A 443
- B 0.2, 1/2, 3/4, −1
- C 3/4, 1/2, 0.2, −1
- D −1, 0.2, 1/2, 3/4

2 A plotter cuts **300** shapes in **10** minutes. A second plotter runs **twice as fast**. How many shapes per minute does the second one cut? B2.12 · TH

- A 60 shapes per minute
- B 150 shapes per minute
- C 30 shapes per minute
- D 35 shapes per minute

3 Work out **1/4 − 7/12.** B2.5 · AP

- A 5/6
- B 9/20
- C -1/3
- D 7/48

4 Order these from **least to greatest**: **1/4 · 0.2 · 1/2 · −1** B1.3 · AP

- A 0.2, 1/2, 1/4, −1
- B −1, 0.2, 1/4, 1/2
- C 1/2, 1/4, 0.2, −1
- D 0.2, 1/4, 1/2, −1

5 A plotter cuts **360** shapes in **12** minutes. A second plotter runs **twice as fast**. How many shapes per minute does the second one cut? B2.12 · TH

- A 35 shapes per minute
- B 180 shapes per minute
- C 60 shapes per minute
- D 30 shapes per minute

6 Work out **2/3 − 3/5.** B2.5 · AP

- A 19/15
- B 2/5
- C 1/15
- D 8/13

7 Order these from **least to greatest**: **1/2 · −3 · 0.75 · 3/4** B1.3 · AP

- A 0.75, 1/2, 3/4, −3
- B 1/2, 0.75, 3/4, −3
- C −3, 1/2, 0.75, 3/4
- D 3/4, 0.75, 1/2, −3

8 **25%** of the **60** survey replies asked for a green roof. How many replies? B2.12 · AP

- A 25
- B 1.5
- C 35
- D 15

9 Work out **1/2 − 1/5.** B2.5 · AP

- A 7/10
- B 3/10
- C 1/10
- D 1/4

10 Order these from **least to greatest**: **2 · −3 · −1 · 0.75** B1.3 · AP

- A −3, −1, 0.75, 2
- B 2, 0.75, −1, −3
- C 0.75, 2, −1, −3
- D 0.75, −1, 2, −3

11 **15%** of the **200** survey replies asked for a green roof. How many replies? B2.12 · AP

- A 3.0
- B 30
- C 185
- D 15

12 Work out **1/2 + 7/8.** B2.5 · AP

- A 4/5
- B -3/8
- C 11/8
- D 7/16

Keep the formula sheet beside you. Students have it on the day; practising without it trains a skill the assessment does not test.

The glossary — part 1 of 3

EQAO publishes an official Junior-Division glossary, and students may consult it **during the assessment**. Knowing it is worth marks.

> **Cover the right column and work down. Then cover the left column and work back up. Both directions — the assessment asks both ways.**

Term	What it means
acute angle	an angle less than 90°
obtuse angle	an angle between 90° and 180°
congruent	exactly the same shape and size
diagonal	a line joining two non-adjacent corners
composite number	a whole number with more than two factors
prime factor	a factor that is itself a prime number
factor tree	a diagram that splits a number down to its primes
expanded form	each digit written as itself times its place value, added up
integer	a whole number, positive, negative or zero
discrete data	data counted in whole steps
continuous data	data measured on a scale
range	the largest value minus the smallest
median	the middle value once ordered
mean	the total shared equally between all the values
mode	the value that occurs most often
histogram	a graph of grouped intervals, with bars that touch
broken-line graph	a graph showing how one quantity changes over time
stem-and-leaf plot	a display where the leading digit is the stem and each trailing digit a leaf
line plot	a display stacking a mark above each value on a number line
tally table	a record of observations in strokes grouped in fives

Two synonyms worth knowing. Term number and **position number** mean the same thing. So do **pattern core** and the repeating unit. The assessment may use either word.

Mathematical language is a named weakness across every strand. EQAO's own analysis found failures of vocabulary, not calculation, in all five. This is a twenty-minute job that pays across the whole paper.

The glossary — part 2 of 3

EQAO publishes an official Junior-Division glossary, and students may consult it **during the assessment**. Knowing it is worth marks.

> **Cover the right column and work down. Then cover the left column and work back up. Both directions — the assessment asks both ways.**

Term	What it means
infographic	several representations combined to tell a story about a data set
sample	a part of a population chosen to represent the whole
theoretical probability	the probability worked out from the design of the experiment
experimental probability	the probability worked out from trials that actually happened
term number	the position of a term in a pattern, also called the position number
term value	the value of the term at that position
pattern core	the smallest part of a repeating pattern that starts over
growing pattern	a pattern whose terms increase
shrinking pattern	a pattern whose terms decrease
table of values	a table pairing each term number with its term value
loop	a coding instruction that repeats a set number of times
efficient code	code that does the same work in fewer instructions
Cartesian plane	a grid with an x-axis and a y-axis, in four quadrants
quadrant	one of the four regions of the Cartesian plane
translation	a slide, with no turning or flipping
reflection	a flip across a line of reflection
rotation	a turn about a point of rotation
line of symmetry	a fold line where both halves match
rotational symmetry	how many times a shape looks the same in one full turn
net	a flat pattern that folds up into a 3-D object

Mathematical language is a named weakness across every strand. EQAO's own analysis found failures of vocabulary, not calculation, in all five. This is a twenty-minute job that pays across the whole paper.

The glossary — part 3 of 3

EQAO publishes an official Junior-Division glossary, and students may consult it **during the assessment**. Knowing it is worth marks.

> **Cover the right column and work down. Then cover the left column and work back up. Both directions — the assessment asks both ways.**

Term	What it means
surface area	the total area of all the faces of a 3-D object
vertex	a corner where edges meet
edge	a line where two faces meet
supplementary angles	two angles that add to 180°
complementary angles	two angles that add to 90°
clockwise	the direction a clock's hands turn
counterclockwise	the opposite direction to a clock's hands
capacity	how much a container can hold
mass	how much matter something contains
interest rate	the percentage charged for borrowing, or paid for saving
mortgage	a long-term loan used to buy property
discount	an amount taken off a price
chequing account	an account for everyday spending, paying little or no interest
savings account	an account for money left alone, which pays interest
e-transfer	moving money between accounts electronically
fees	charges made for using an account or service
income	money coming in
investment	money put in with the aim of growing over time

Mathematical language is a named weakness across every strand. EQAO's own analysis found failures of vocabulary, not calculation, in all five. This is a twenty-minute job that pays across the whole paper.

Week 1

Ten questions, mixed across the strands in blueprint proportion — three Number, two Algebra, two Data, two Spatial Sense, one Financial Literacy.

> **One week at a time. Ten questions is about twenty minutes, which is the point — short enough to actually happen.**

1 A batch of **300** tiles arrives. **1%** of them are cracked. How many are cracked? B2.3 · AP

- A 30.0
- B 3
- C 6.0
- D 1

2 Two lengths of cedar measure **31.06 m** and **3.08 m**. What is the difference? B2.4 · AP

- A 34.14
- B 27.98
- C 279.80
- D 28.08

3 Work out **3/8 + 5/6**. B2.5 · AP

- A 5/16
- B -11/24
- C 4/7
- D 29/24

4
```
set total to 0
repeat 5 times
  add 3 to total
end repeat
```
The **5** is changed to **7**. What is the new total? C3.2 · AP

- A 21
- B 879
- C 15
- D 24

5 A pattern begins **7, 9, 11, 13, …** Which describes it? C1.1 · KU

- A repeating — the same block comes round again
- B linear growing — it goes up by the same amount each time
- C shrinking — it goes down each time
- D non-linear growing — the jump gets bigger each time

6 Heights in centimetres: **10, 31, 34, 42, 44, 47, 58**
What is the **mean**? D1.5 · TH

- A 38
- B 58
- C 48
- D 42

7 A rival proposal shows a graph where **the vertical axis starts at 80 instead of 0**. Why is this misleading? D1.6 · TH

- A Extra dimensions make some bars look bigger than their value.
- B Unequal intervals distort the shape of the data.
- C Choosing which data to leave out can reverse the apparent trend.
- D It exaggerates small differences — the bars look many times taller than each other.

8 What is the **order of rotational symmetry** of a **rectangle**? E1.1 · KU

- A 6
- B 4
- C 5
- D 2

9 Which describes a **isosceles trapezoid**? E1.1 · AP

- A 0 lines of symmetry, rotational order 2
- B 4 lines of symmetry, rotational order 4
- C 2 lines of symmetry, rotational order 2
- D 1 line of symmetry, rotational order 1

10 **An unexpected repair bill arriving** — what is this? F1.2 · KU

- ◯ **A** a factor that interferes with a goal
- ◯ **B** an earning goal
- ◯ **C** a step that helps reach a goal
- ◯ **D** a saving goal

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Week 2

Ten questions, mixed across the strands in blueprint proportion — three Number, two Algebra, two Data, two Spatial Sense, one Financial Literacy.

> **One week at a time. Ten questions is about twenty minutes, which is the point — short enough to actually happen.**

1 Sand and cement are mixed in the ratio **4 : 7**. If **12 kg** of sand is used, how much cement? B2.12 · AP

- A 12 kg
- B 33 kg
- C 7 kg
- D 21 kg

2 The studio orders **5** boxes of **28** brackets, then returns **16** brackets. How many are kept? B2.1 · TH

- A 140
- B 60
- C 156
- D 124

3 Write **120** as a product of its **prime factors**. B2.6 · AP

- A $2 \times 3 \times 5$
- B 1×120
- C $2^3 \times 3$
- D $2^3 \times 3 \times 5$

4 In which equation does **p** have the **greatest** value?

A 2p = 78
B 50 − p = 20
C 4p = 212
D 42 + p = 85 C2.3 · TH

- A 50 − p = 20
- B 42 + p = 85
- C 2p = 78
- D 4p = 212

5 Solve the inequality **3x + 11 < 32**. What is the **greatest whole number** value of x? C2.4 · AP

- A 63
- B 21
- C 8
- D 6

6 What is an **infographic** meant to do with a data set? D1.4 · KU

- A make the data look more impressive than it is
- B show every single data value in a long table
- C replace the need for any titles, labels or sources
- D tell a story about the data using graphs, numbers and other relevant information together

7 After **100** spins the experimental probability is **50/100**, but the theoretical probability is **1/2**. Why are they different? D2.2 · TH

- A The spinner must be unfair
- B Random variation — a finite number of trials rarely matches the theory exactly
- C The theoretical probability was worked out wrongly
- D Experimental probability is always larger

8 A point moves from **(0, 0)** to **(3, -5)**. Describe the translation. E1.3 · AP

- A 3 left and 5 up
- B 3 right and 5 down
- C 5 left and 3 up
- D 8 right

9 A rotation of **270° clockwise** about a point has the same result as which rotation? E1.4 · AP

- A 90° clockwise
- B 89
- C 90° counterclockwise
- D 270° counterclockwise

10 Which method of payment **cannot be traced or reversed if it is lost?** F1.1 · KU

- A credit card
- B cash
- C e-transfer
- D debit card

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Week 3

Ten questions, mixed across the strands in blueprint proportion — three Number, two Algebra, two Data, two Spatial Sense, one Financial Literacy.

> **One week at a time. Ten questions is about twenty minutes, which is the point — short enough to actually happen.**

1 Order these from **least to greatest**: **−1 · 1/2 · 1.5 · 3/4** B1.3 · AP

- **A** 1.5, 1/2, 3/4, −1
- **B** 1/2, 3/4, −1, 1.5
- **C** −1, 1/2, 3/4, 1.5
- **D** 1.5, 3/4, 1/2, −1

2 Which number lies between **8.166** and **8.266**? B1.4 · KU

- **A** 8.146
- **B** 8.296
- **C** 8.216
- **D** 8.066

3 Round **50.123** to the nearest **whole number**. B1.5 · KU

- **A** 50
- **B** 50.13
- **C** 50.1
- **D** 51

4 Four term values of a growing pattern are shown.
Term number: 3 · 5 · 7 · ?
Term value: 20 · 30 · 40 · 80
What is the **term number** when the term value is 80? C1.3 · AP

- **A** 17
- **B** 15
- **C** 80
- **D** 65

5 Three patterns:
P starts at 1, rule **add 3**
Q starts at 69, rule **subtract 10**
R starts at 19, rule **multiply by 2**
Which number appears in **all three** patterns? C1.3 · TH

- **A** 19
- **B** 59
- **C** 22
- **D** 38

6 Two independent events: a fair spinner with **2** equal sections, and a fair coin. What is the theoretical probability of getting a **specific** result on both? D2.2 · TH

- **A** 2/4
- **B** 2/2
- **C** 1/4
- **D** 114

7 A stem-and-leaf plot shows:
2 | 1 3 7 9
How many values are in the data set? D1.3 · KU

- **A** 2
- **B** 5
- **C** 4
- **D** 20

8 A planter is a rectangular prism **3 cm × 5 cm × 6 cm**. What is its **surface area**? E2.6 · AP

- **A** 63 cm^2
- **B** 126 cm^2
- **C** 90 cm^3
- **D** 28 cm^2

9 You are given the formula sheet. Which formula do you need for **a kite with diagonals 14 cm and 8 cm**? E2.4 · KU

- **A** $A = (b_1 + b_2) \times h \div 2$
- **B** $A = c \times d \div 2$
- **C** $A = b \times h \div 2$
- **D** $A = b \times h$

10 You need to **borrow $1500** for 2 years. One lender charges **3%** simple interest, another charges **4%**. Which costs less, and by how much? F1.4 · TH

- **A** 3%, by $30
- **B** 4%, by $30
- **C** They cost the same
- **D** 3%, by $1

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Week 4

Ten questions, mixed across the strands in blueprint proportion — three Number, two Algebra, two Data, two Spatial Sense, one Financial Literacy.

> **One week at a time. Ten questions is about twenty minutes, which is the point — short enough to actually happen.**

1 Two lengths of cedar measure **43.29 m** and **6.19 m**. What is the difference? B2.4 · AP

- A 49.48
- B 37.10
- C 371.00
- D 37.20

2 Work out **9/10 + 1/2**. B2.5 · AP

- A 7/5
- B 5/6
- C 2/5
- D 9/20

3 A run of decking is **344 cm** long. The plan calls for **5.8** times that length in total. How long is that? B2.7 · AP

- A 1995.2 cm
- B 19952 cm
- C 349.8 cm
- D 199.52 cm

4 This code should display "**Correct**" when a whole number is divisible by **9**.

```
input number
if number ______
  then display "Correct"
end
```

Which condition completes it? C3.1 · AP

- A has a last digit of 0 or 5
- B has a digit sum divisible by 9
- C is divisible by both 2 and 5
- D has an even last digit

5
```
set total to 10
repeat 8 times
  increase total by 10
end repeat
```

What is **total** at the end? C3.2 · AP

- A 90
- B 80
- C 262
- D 20

6 Which graph best represents **the number of votes for each of five different designs?** D1.3 · KU

- A histogram
- B circle graph
- C broken-line graph
- D bar graph

7 Heights in centimetres: **20, 31, 34, 49, 56**

What is the **range**? D1.5 · TH

- A 36
- B 38
- C 56
- D 34

8 Point **(7, 5)** is reflected in the **x-axis**. What are the new coordinates? E1.4 · AP

- A (-7, 5)
- B (5, 7)
- C (7, -5)
- D (-7, -5)

9 A shape undergoes **a translation 3 right then a reflection in the y-axis**. What is the result? E1.4 · TH

- A the shape is on the other side, 3 units from where it started
- B the shape has been enlarged
- C the same result as a single reflection in the x-axis
- D the shape is back exactly where it started

10 Which term means **a plan for what money comes in and where it goes**? F1.2 · KU

- A fees
- B interest earned
- C income
- D budget

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Week 5

Ten questions, mixed across the strands in blueprint proportion — three Number, two Algebra, two Data, two Spatial Sense, one Financial Literacy.

> **One week at a time. Ten questions is about twenty minutes, which is the point — short enough to actually happen.**

1 The studio orders **4** boxes of **29** brackets, then returns **24** brackets. How many are kept? (B2.1 · TH)

- A 92
- B 20
- C 140
- D 116

2 Write **140** as a product of its **prime factors**. (B2.6 · AP)

- A $2^2 \times 5 \times 7$
- B $2 \times 5 \times 7$
- C $2^2 \times 5$
- D 1×140

3 Is **63** a prime number or a composite number? (B2.6 · KU)

- A neither
- B both
- C composite
- D prime

4 Simplify **5x + 6x**. (C2.1 · KU)

- A 5x6
- B $11x^2$
- C 30x
- D 11x

5 Evaluate **7x + 4** when **x = 6.9**. (C2.2 · AP)

- A 52.3
- B 76.3
- C 17.9
- D 44.3

6 A class surveys the school by **asking every student in the school**. What is that? (D1.2 · AP)

- A the whole population, not a sample
- B 150
- C a random sample of library users
- D a biased sample

7 What is an **infographic** meant to do with a data set? (D1.4 · KU)

- A show every single data value in a long table
- B make the data look more impressive than it is
- C tell a story about the data using graphs, numbers and other relevant information together
- D replace the need for any titles, labels or sources

8 Convert **250 cm²** to **m²**. (E2.1 · AP)

- A 2.5e+06 m²
- B 0.025 m²
- C 0.25 m²
- D 0.0025 m²

9 The **acute** angle between Line A and Line B is **48°**. What is the angle measuring **counterclockwise** from Line A to Line B? (E2.2 · AP)

- A 228°
- B 132°
- C 312°
- D 42°

10 Which of these **is for everyday spending, and usually pays little or no interest?** (F1.4 · KU)

- A a chequing account
- B a mortgage
- C a savings account
- D a loan

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Week 6

Ten questions, mixed across the strands in blueprint proportion — three Number, two Algebra, two Data, two Spatial Sense, one Financial Literacy.

> **One week at a time. Ten questions is about twenty minutes, which is the point — short enough to actually happen.**

1 Which number lies between **8.295** and **8.395**? (B1.4 · KU)

- A 8.425
- B 8.345
- C 8.275
- D 8.195

2 Round **37.728** to the nearest **tenth.** (B1.5 · KU)

- A 263
- B 37.74
- C 37.7
- D 38

3 Select the option that is **NOT** equal to **9 tenths.** (B1.6 · AP)

- A 9.0
- B 0.9
- C 0.09
- D 9/10

4 Two programs both add **5** to a total **5** times.
Program A writes `add 5 to total` out 5 separate times.
Program B writes `repeat 5 times: add 5 to total.`
Which is more **efficient**, and why? (C3.2 · TH)

- A Program A — more lines means more gets done
- B Program B — it uses a loop, so fewer lines do the same work
- C They are equally efficient because the answer is the same
- D Program A — loops always run more slowly

5
```
set total to 2
repeat 5 times
  add 2 to total
end repeat
```
The **5** is changed to **6**. What is the new total? (C3.2 · AP)

- A 933
- B 12
- C 14
- D 16

6 A spinner has **10** equal sections. **4** of them are green. What is the probability of landing on green, as a **percent**? (D2.1 · AP)

- A 4%
- B 40%
- C 20%
- D 6%

7 Two independent events: a fair spinner with **2** equal sections, and a fair coin. What is the theoretical probability of getting a **specific** result on both? (D2.2 · TH)

- A 2/2
- B 1/4
- C 772
- D 2/4

8 A parallelogram has a base of **16 cm**, a slanted side of **13 cm**, and a perpendicular height of **10 cm.** What is its area? (E2.4 · AP)

- A 58 cm²
- B 80 cm²
- C 160 cm²
- D 208 cm²

9 A **kite** has diagonals of **9 cm** and **8 cm**. What is its area? E2.4 · AP

- A $36\ cm^2$
- B $72\ cm^2$
- C $17\ cm^2$
- D $34\ cm^2$

10 A tool costs **$120** and is on sale at **15% off**. What is the sale price? F1.1 · AP

- A $105
- B $18
- C $102
- D $138

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Week 7

Ten questions, mixed across the strands in blueprint proportion — three Number, two Algebra, two Data, two Spatial Sense, one Financial Literacy.

> **One week at a time. Ten questions is about twenty minutes, which is the point — short enough to actually happen.**

1 Work out **1/2 + 1/3**. B2.5 · AP

- A 5/6
- B 12
- C 2/5
- D 1/6

2 A run of decking is **511 cm** long. The plan calls for **2.1** times that length in total. How long is that? B2.7 · AP

- A 513.1 cm
- B 10731 cm
- C 1073.1 cm
- D 107.31 cm

3 **22** litres of sealant is poured into cans holding **0.3 L** each. How many cans? B2.8 · AP

- A 6.6
- B 73.3
- C 21.7
- D 7.33

4 Solve for x: **3x + 18 = 48** C2.3 · AP

- A 28
- B 10
- C 45
- D 30

5 In which equation does **p** have the **greatest** value?

A 77 + p = 111
B 3p = 129
C 98 − p = 56
D 60 − p = 29 C2.3 · TH

- A 98 − p = 56
- B 77 + p = 111
- C 60 − p = 29
- D 3p = 129

6 Is **the temperature through the day** discrete or continuous data? D1.1 · KU

- A continuous
- B qualitative
- C discrete
- D neither

7 Which graph best represents **the temperature of the site recorded every hour through one day**? D1.3 · KU

- A histogram
- B bar graph
- C broken-line graph
- D circle graph

8 Which shape has **exactly 0** lines of symmetry? E1.1 · KU

- A rhombus
- B kite
- C square
- D trapezoid

9 Which statement describes the **diagonals** of a **trapezoid**? E1.1 · KU

- A equal, perpendicular, bisect each other
- B perpendicular and bisect each other, not equal
- C neither equal nor bisecting
- D equal and bisect each other, not perpendicular

10 Which word means **swapping one thing for another without money changing hands**? F1.5 · KU

- A trading
- B borrowing
- C lending
- D donating

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Week 8

Ten questions, mixed across the strands in blueprint proportion — three Number, two Algebra, two Data, two Spatial Sense, one Financial Literacy.

> **One week at a time. Ten questions is about twenty minutes, which is the point — short enough to actually happen.**

1 Write **140** as a product of its **prime factors.** B2.6 · AP

- A $2^2 \times 5 \times 7$
- B $2^2 \times 5$
- C 1×140
- D $2 \times 5 \times 7$

2 Is **77** a prime number or a composite number? B2.6 · KU

- A neither
- B both
- C composite
- D prime

3 Write **453 183** in **expanded form.** B1.1 · KU

- A 4 × 100 000 × 5 × 10 000 × 3 × 1000 × 1 × 100 × 8 × 10 × 3 × 1
- B 3 × 1 + 8 × 10 + 1 × 100 + 3 × 1000 + 5 × 10 000 + 4 × 100 000
- C 4 × 100 000 + 5 × 10 000 + 3 × 1000 + 1 × 100 + 8 × 10
- D 4 × 100 000 + 5 × 10 000 + 3 × 1000 + 1 × 100 + 8 × 10 + 3 × 1

4 A pattern begins **10, 17, 24, 31, …** Which describes it? C1.1 · KU

- A non-linear growing — the jump gets bigger each time
- B repeating — the same block comes round again
- C shrinking — it goes down each time
- D linear growing — it goes up by the same amount each time

5 Four term values of a growing pattern are shown.
Term number: 3 · 5 · 7 · ?
Term value: 14 · 20 · 26 · 44
What is the **term number** when the term value is 44? C1.3 · AP

- A 13
- B 31
- C 44
- D 15

6 Which display **records each observation with a stroke, grouped in fives?** D1.3 · KU

- A tally table
- B histogram
- C frequency table
- D line plot

7 A class surveys the school by **asking every student in the school**. What is that? D1.2 · AP

- A the whole population, not a sample
- B a biased sample
- C a random sample of library users
- D 733

8 Two lines cross. One angle is **66°**. What is the angle **opposite** it? E2.3 · KU

- A 24°
- B 66°
- C 114°
- D 294°

9 A rectangle of decking measures **15 cm by 12 cm**. A rectangular notch measuring **5 cm by 6 cm** is cut out of one corner. What is the remaining area? E2.4 · TH

- A 150 cm²
- B 169 cm²
- C 210 cm²
- D 180 cm²

10 The studio borrows **$400** at **6%** simple interest for one year. How much interest is owed after one year? F1.4 · AP

- A $2400
- B $424
- C $24
- D $6

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Week 9

Ten questions, mixed across the strands in blueprint proportion — three Number, two Algebra, two Data, two Spatial Sense, one Financial Literacy.

> **One week at a time. Ten questions is about twenty minutes, which is the point — short enough to actually happen.**

1 Round **12.328** to the nearest **hundredth**. B1.5 · KU

- A 12.34
- B 13
- C 12.33
- D 12.3

2 Select the option that is **NOT** equal to **7 tenths**. B1.6 · AP

- A 0.7
- B 7/10
- C 0.07
- D 7.0

3 Which number is divisible by **9**? B2.2 · KU

- A 886
- B 890
- C 882
- D 883

4 Solve the inequality **2x + 5 < 33**. What is the **greatest whole number** value of x? C2.4 · AP

- A 56
- B 13
- C 28
- D 15

5 This code should display **"Correct"** when a whole number is divisible by **9**.

```
input number
if number ______
  then display "Correct"
end
```

Which condition completes it? C3.1 · AP

- A is divisible by both 2 and 5
- B has a last digit of 0 or 5
- C has an even last digit
- D has a digit sum divisible by 9

6 A rival proposal shows a graph where **the vertical axis starts at 80 instead of 0**. Why is this misleading? D1.6 · TH

- A Choosing which data to leave out can reverse the apparent trend.
- B Unequal intervals distort the shape of the data.
- C Extra dimensions make some bars look bigger than their value.
- D It exaggerates small differences — the bars look many times taller than each other.

7 A bag holds **10** tiles and **1** are cracked. What is the probability of drawing a cracked tile, in **simplest form**? D2.1 · AP

- A 10/1
- B 1/11
- C 1/9
- D 1/10

8 A sign is made of a **rectangle 14 cm by 5 cm** with a **triangle** on top (base 8 cm, height 3 cm). What is the total area? E2.4 · TH

- A 94 cm^2
- B 70 cm^2
- C 82 cm^2
- D 47 cm^2

9 What is the **order of rotational symmetry** of a **isosceles trapezoid**? E1.1 · KU

- A 4
- B 5
- C 1
- D 2

10 **An unexpected repair bill arriving** — what is this? F1.2 · KU

- A a saving goal
- B a factor that interferes with a goal
- C an earning goal
- D a step that helps reach a goal

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Week 10

Ten questions, mixed across the strands in blueprint proportion — three Number, two Algebra, two Data, two Spatial Sense, one Financial Literacy.

> **One week at a time. Ten questions is about twenty minutes, which is the point — short enough to actually happen.**

1 A run of decking is **601 cm** long. The plan calls for **6.2** times that length in total. How long is that? B2.7 · AP

- A 607.2 cm
- B 37262 cm
- C 372.62 cm
- D 3726.2 cm

2 **40** litres of sealant is poured into cans holding **0.5 L** each. How many cans? B2.8 · AP

- A 20
- B 80
- C 8
- D 39.5

3 A **30 m** length of trim is cut into pieces each **1/4 m** long. How many pieces? B2.10 · TH

- A 120
- B 26
- C 967
- D 15/2

4 Three patterns:
P starts at 3, rule **add 3**
Q starts at 35, rule **subtract 10**
R starts at 15, rule **multiply by 2**
Which number appears in **all three** patterns? C1.3 · TH

- A 18
- B 15
- C 25
- D 30

5 Simplify **6x + 3x**. C2.1 · KU

- A 9x
- B 6x3
- C $9x^2$
- D 18x

6 A fair 2-section spinner has one red section. What is the **theoretical** probability of red? D2.2 · KU

- A 1/2
- B 1/100
- C 55/100
- D 2/1

7 Is **the time taken to lay one row of decking** discrete or continuous data? D1.1 · KU

- A discrete
- B continuous
- C neither
- D qualitative

8 Which 3-D object gives **a rectangle from the top and front, a square from the side**? E1.2 · AP

- A a cylinder
- B a rectangular prism
- C a square pyramid
- D a cube

9 A point moves from **(4, 3)** to **(5, 8)**. Describe the translation. E1.3 · AP

- A 5 right and 1 up
- B 1 right and 5 up
- C 6 right
- D 1 left and 5 dow

10 Which statement describes a **debit card**? F1.1 · KU

- A moves money between accounts electronically, usually with a fee or a limit
- B cannot be traced or reversed if it is lost
- C often charges a high interest rate on any unpaid balance
- D takes the money straight from your own bank account

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Week 11

Ten questions, mixed across the strands in blueprint proportion — three Number, two Algebra, two Data, two Spatial Sense, one Financial Literacy.

> **One week at a time. Ten questions is about twenty minutes, which is the point — short enough to actually happen.**

1 Is **13** a prime number or a composite number? (B2.6 · KU)

- A both
- B prime
- C neither
- D composite

2 Write **295 618** in **expanded form.** (B1.1 · KU)

- A 2 × 100 000 × 9 × 10 000 × 5 × 1000 × 6 × 100 × 1 × 10 × 8 × 1
- B 2 × 100 000 + 9 × 10 000 + 5 × 1000 + 6 × 100 + 1 × 10 + 8 × 1
- C 8 × 1 + 1 × 10 + 6 × 100 + 5 × 1000 + 9 × 10 000 + 2 × 100 000
- D 2 × 100 000 + 9 × 10 000 + 5 × 1000 + 6 × 100 + 1 × 10

3 The Commission budget is written as **474,417**. Which is the value of the digit in the **ten thousands** place? (B1.1 · KU)

- A 400,000
- B 7
- C 4,000
- D 70,000

4
```
set total to 3
repeat 4 times
  increase total by 3
end repeat
```
What is **total** at the end? (C3.2 · AP)

- A 6
- B 15
- C 577
- D 12

5 Two programs both add **10** to a total **10** times.
Program A writes `add 10 to total` out 10 separate times.
Program B writes `repeat 10 times: add 10 to total`.
Which is more **efficient**, and why? (C3.2 · TH)

- A They are equally efficient because the answer is the same
- B Program B — it uses a loop, so fewer lines do the same work
- C Program A — loops always run more slowly
- D Program A — more lines means more gets done

6 A stem-and-leaf plot shows:
3 | 1 2 4 6 9
What is the **median**? (D1.3 · AP)

- A 34
- B 31
- C 39
- D 30

7 Which display **records each observation with a stroke, grouped in fives?** (D1.3 · KU)

- A line plot
- B tally table
- C frequency table
- D histogram

8 A trapezoid has parallel sides of **9 cm** and **15 cm** and a height of **6 cm**. What is its area? (E2.4 · AP)

- A 72 cm²
- B 18 cm²
- C 135 cm²
- D 144 cm²

9 A planter is a rectangular prism **3 cm × 4 cm × 10 cm**. What is its **surface area**? E2.6 · AP

- A $82\ cm^2$
- B $34\ cm^2$
- C $164\ cm^2$
- D $120\ cm^3$

10 You need to **borrow $1500** for 1 year. One lender charges **3%** simple interest, another charges **4%**. Which costs less, and by how much? F1.4 · TH

- A 3%, by $1
- B 3%, by $15
- C They cost the same
- D 4%, by $15

Weekly beats daily. This is the cadence TDSB runs on its own resources page, and it works because it is small enough to sustain for a whole term. Mark against the expectation code, not out of ten.

Week 12

Ten questions, mixed across the strands in blueprint proportion — three Number, two Algebra, two Data, two Spatial Sense, one Financial Literacy.

> **One week at a time. Ten questions is about twenty minutes, which is the point — short enough to actually happen.**

1 Select the option that is **NOT** equal to **8 hundredths.** B1.6 · AP

- ○ A 0.08
- ○ B 0.8
- ○ C 8/100
- ○ D 8.00

2 Which number is divisible by **3**? B2.2 · KU

- ○ A 664
- ○ B 663
- ○ C 665
- ○ D 969

3 Select the **TWO** prime numbers. B2.6 · KU

Select **all** that apply.

- ☐ A 24
- ☐ B 17
- ☐ C 47
- ☐ D 49
- ☐ E 42

4 Evaluate **5x + 2** when **x = 2.9.** C2.2 · AP

- ○ A 24.5
- ○ B 9.9
- ○ C 16.5
- ○ D 12.5

5 Solve for x: **9x + 8 = 35** C2.3 · AP

- ○ A 3
- ○ B 26
- ○ C 11
- ○ D 27

6 Heights in centimetres: **12, 16, 19, 45, 51, 54, 55**

What is the **mean**? D1.5 · TH

- ○ A 45
- ○ B 55
- ○ C 43
- ○ D 36

7 A rival proposal shows a graph where **the vertical axis starts at 80 instead of 0**. Why is this misleading? D1.6 · TH

- ○ A It exaggerates small differences — the bars look many times taller than each other.
- ○ B Choosing which data to leave out can reverse the apparent trend.
- ○ C Extra dimensions make some bars look bigger than their value.
- ○ D Unequal intervals distort the shape of the data.

8 Which describes a **square**? E1.1 · AP

- ○ A 2 lines of symmetry, rotational order 2
- ○ B 4 lines of symmetry, rotational order 4
- ○ C 0 lines of symmetry, rotational order 2
- ○ D 1 line of symmetry, rotational order 1

9 Point **(2, 6)** is reflected in the **y-axis**. What are the new coordinates? E1.4 · AP

- ○ A (6, 2)
- ○ B (2, -6)
- ○ C (-2, -6)
- ○ D (-2, 6)

10 Which term means **money a bank pays you for keeping savings with them?** F1.2 · KU

- ○ A fees
- ○ B interest earned
- ○ C income
- ○ D budget

Weekly beats daily. This is the cadence TDSB runs on its own resources page, and it works because it is small enough to sustain for a whole term. Mark against the expectation code, not out of ten.

Mathematics — Full Paper 3

44 questions in 4 stages of 11, to the exact EQAO Junior Division blueprint — now including the Volume 2 content.

Before you start

Have the **official formula sheet** and the **glossary** beside you. You get both on the day. A calculator and paper for rough work are allowed. There is no time limit here — the real assessment allows additional time for every student.

Strand	Questions	Share
B · Number	14	32%
C · Algebra	9	20%
D · Data	8	18%
E · Spatial Sense	9	20%
F · Financial Literacy	4	9%
Total	**44**	**100%**

Name

Mark by expectation code, not out of 44. One paper cannot give you a level. List every code you missed more than once — that list is the teaching plan.

Papers 3 and 4 draw on both volumes, so a code you have never met will show up here if Volume 1 was all you used.

Paper 3 — Stage 1

Questions 1 to 11. One sitting per stage.

1 Simplify **9x + 2x.** C2.1 · KU

- A 9x2
- B $11x^2$
- C 18x
- D 11x

2 In which equation does **p** have the **greatest** value?

A 88 + p = 141
B 93 − p = 46
C 72 + p = 112
D 62 + p = 93 C2.3 · TH

- A 88 + p = 141
- B 62 + p = 93
- C 72 + p = 112
- D 93 − p = 46

3 Which graph best represents **the number of votes for each of five different designs?** D1.3 · KU

- A histogram
- B broken-line graph
- C bar graph
- D circle graph

4 Simplify **3x + 4x.** C2.1 · KU

- A $7x^2$
- B 12x
- C 7x
- D 3x4

5 Round **95.392** to the nearest **hundredth.** B1.5 · KU

- A 95.39
- B 96
- C 95.3
- D 95.40

6 Heights in centimetres: **18, 21, 23, 27, 28, 41, 45**
What is the **median**? D1.5 · TH

- A 27
- B 29
- C 18
- D 45

7 Is **77** a prime number or a composite number? B2.6 · KU

- A composite
- B neither
- C both
- D prime

8 Which display **stacks an X above each value on a number line, so the shape of the data shows?** D1.3 · KU

- A tally table
- B histogram
- C frequency table
- D line plot

9 Work out **1/2 − 1/4.** B2.5 · AP

- A 1/8
- B 1/3
- C 1/4
- D 3/4

10 What is the **order of rotational symmetry** of a **parallelogram**? E1.1 · KU

- A 6
- B 4
- C 5
- D 2

11 A rival proposal shows a graph where **only three of the twelve months are shown.** Why is this misleading? D1.6 · TH

- A Extra dimensions make some bars look bigger than their value.
- B It exaggerates small differences — the bars look many times taller than each other.
- C Unequal intervals distort the shape of the data.
- D Choosing which data to leave out can reverse the apparent trend.

Check before you move on. On the real assessment you can change any answer until you submit the stage.

Paper 3 — Stage 2

Questions 12 to 22. One sitting per stage.

12 Which number lies between **5.120** and **5.220**? B1.4 · KU

- A 5.170
- B 5.100
- C 5.250
- D 5.020

13 A parallelogram has a base of **9 cm**, a slanted side of **7 cm**, and a perpendicular height of **5 cm**. What is its area? E2.4 · AP

- A 22 cm^2
- B 32 cm^2
- C 63 cm^2
- D 45 cm^2

14 Order these from **least to greatest**: **1/2 · 3/4 · 2 · 0.2** B1.3 · AP

- A 0.2, 1/2, 3/4, 2
- B 2, 3/4, 1/2, 0.2
- C 0.2, 1/2, 2, 3/4
- D 886

15 Two lengths of cedar measure **43.02 m** and **1.35 m**. What is the total length? B2.4 · AP

- A 41.67
- B 44.47
- C 443.70
- D 44.37

16 A plotter cuts **300** shapes in **10** minutes. A second plotter runs **twice as fast**. How many shapes per minute does the second one cut? B2.12 · TH

- A 30 shapes per minute
- B 150 shapes per minute
- C 35 shapes per minute
- D 60 shapes per minute

17 Simplify **8x + 3x**. C2.1 · KU

- A 24x
- B $11x^2$
- C 11x
- D 8x3

18 A stem-and-leaf plot shows:

2 | 4 5 7 9

How many values are in the data set? D1.3 · KU

- A 2
- B 4
- C 25
- D 5

19 A trapezoid has parallel sides of **6 cm** and **12 cm** and a height of **4 cm**. What is its area? E2.4 · AP

- A 72 cm^2
- B 707
- C 36 cm^2
- D 12 cm^2

20 Select the **TWO** prime numbers. B2.6 · KU

Select **all** that apply.

- A 33
- B 45
- C 24
- D 29
- E 47

21 What is an **infographic** meant to do with a data set? D1.4 · KU

- A tell a story about the data using graphs, numbers and other relevant information together
- B replace the need for any titles, labels or sources
- C show every single data value in a long table
- D make the data look more impressive than it is

22 **40** planters are ordered. **2/3** of them are cedar. How many are cedar? B2.9 · AP

- A 60
- B 20.0
- C 80/3
- D 37

Check before you move on. On the real assessment you can change any answer until you submit the stage.

Paper 3 — Stage 3

Questions 23 to 33. One sitting per stage.

23
```
set total to 10
repeat 8 times
  increase total by 10
end repeat
```
What is **total** at the end? C3.2 · AP

- A 90
- B 167
- C 20
- D 80

24 **Saving 20% of every payment towards a new laptop** — what is this? F1.2 · KU

- A a step that helps reach a goal
- B a saving goal
- C a factor that interferes with a goal
- D an earning goal

25 Which word means **swapping one thing for another without money changing hands?** F1.5 · KU

- A donating
- B lending
- C borrowing
- D trading

26 A rectangle of decking measures **18 cm by 10 cm**. A rectangular notch measuring **4 cm by 8 cm** is cut out of one corner. What is the remaining area? E2.4 · TH

- A 212 cm^2
- B 168 cm^2
- C 148 cm^2
- D 180 cm^2

27 Which number is divisible by **8**? B2.2 · KU

- A 305
- B 311
- C 308
- D 304

28 A point moves from **(-5, 6)** to **(1, 11)**. Describe the translation. E1.3 · AP

- A 11 right
- B 6 left and 5 dow
- C 6 right and 5 up
- D 5 right and 6 up

29 A shape undergoes **a reflection in the y-axis then a rotation of 180° about the origin**. What is the result? E1.4 · TH

- A the shape is on the other side, 3 units from where it started
- B the shape has been enlarged
- C the same result as a single reflection in the x-axis
- D the shape is back exactly where it started

30 Convert **2500 cm** to **m**. E2.1 · AP

- A 250 m
- B 2.5 m
- C 25 m
- D 250000 m

31 The **acute** angle between Line A and Line B is **48°**. What is the angle measuring **counterclockwise** from Line A to Line B? E2.2 · AP

- A 228°
- B 132°
- C 312°
- D 42°

32

```
set total to 4
repeat 6 times
  increase total by 2
end repeat
```

What is **total** at the end? C3.2 · AP

- A 6
- B 12
- C 16
- D 26

33 A tool costs **$120** and is on sale at **20% off**. What is the sale price? F1.1 · AP

- A $100
- B $96
- C $144
- D $24

Check before you move on. On the real assessment you can change any answer until you submit the stage.

Paper 3 — Stage 4

Questions 34 to 44. One sitting per stage.

34 Write **533 764** in **expanded form.** B1.1 · KU

- **A** 5 × 100 000 × 3 × 10 000 × 3 × 1000 × 7 × 100 × 6 × 10 × 4 × 1
- **B** 5 × 100 000 + 3 × 10 000 + 3 × 1000 + 7 × 100 + 6 × 10 + 4 × 1
- **C** 5 × 100 000 + 3 × 10 000 + 3 × 1000 + 7 × 100 + 6 × 10
- **D** 4 × 1 + 6 × 10 + 7 × 100 + 3 × 1000 + 3 × 10 000 + 5 × 100 000

35 Which term means **money coming in, from work or other sources?** F1.2 · KU

- **A** budget
- **B** interest earned
- **C** fees
- **D** income

36 A 6-sided spinner is spun **100** times and lands on red **17** times. What is the **experimental** probability of red? D2.2 · AP

- **A** 17/100
- **B** 17/6
- **C** 100/17
- **D** 1/6

37 A pattern begins **6, 10, 14, 18, …** Which describes it? C1.1 · KU

- **A** shrinking — it goes down each time
- **B** repeating — the same block comes round again
- **C** non-linear growing — the jump gets bigger each time
- **D** linear growing — it goes up by the same amount each time

38 In which equation does **p** have the **greatest** value?

A 79 + p = 130
B 76 − p = 38
C 53 + p = 99
D 74 + p = 110 C2.3 · TH

- **A** 74 + p = 110
- **B** 79 + p = 130
- **C** 76 − p = 38
- **D** 53 + p = 99

39 A pattern begins **8, 15, 22, 29, …** Which describes it? C1.1 · KU

- **A** repeating — the same block comes round again
- **B** non-linear growing — the jump gets bigger each time
- **C** linear growing — it goes up by the same amount each time
- **D** shrinking — it goes down each time

40 On a vertical number line, the basement floor is at **-2** and the roof deck is at **12**. How many units apart are they? B1.2 · AP

- **A** 14
- **B** 10
- **C** -10
- **D** 16

41 **42** litres of sealant is poured into cans holding **0.5 L** each. How many cans? B2.8 · AP

- **A** 41.5
- **B** 84
- **C** 8.4
- **D** 21

42 The studio orders **8** boxes of **32** brackets, then returns **15** brackets. How many are kept? B2.1 · TH

- **A** 256
- **B** 271
- **C** 136
- **D** 241

43 A bag holds **8** tiles and **2** are cracked. What is the probability of drawing a cracked tile, in **simplest form**? D2.1 · AP

- A 2/10
- B 8/2
- C 2/6
- D 1/4

44 Which 3-D object gives **a circle from the top, a triangle from the front and side**? E1.2 · AP

- A a cone
- B a rectangular prism
- C a cube
- D a cylinder

Check before you move on. On the real assessment you can change any answer until you submit the stage.

Mathematics — Full Paper 4

44 questions in 4 stages of 11, to the exact EQAO Junior Division blueprint — now including the Volume 2 content.

Before you start

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B · Number	14	32%
C · Algebra	9	20%
D · Data	8	18%
E · Spatial Sense	9	20%
F · Financial Literacy	4	9%
Total	**44**	**100%**

Name

Mark by expectation code, not out of 44. One paper cannot give you a level. List every code you missed more than once — that list is the teaching plan.

Papers 3 and 4 draw on both volumes, so a code you have never met will show up here if Volume 1 was all you used.

Paper 4 — Stage 1

Questions 1 to 11. One sitting per stage.

1 The studio orders **4** boxes of **15** brackets, then returns **25** brackets. How many are kept? B2.1 · TH

- A 85
- B -40
- C 35
- D 60

2 Two programs both add **3** to a total **6** times.
Program A writes `add 3 to total` out 6 separate times.
Program B writes `repeat 6 times: add 3 to total`.
Which is more **efficient**, and why? C3.2 · TH

- A Program B — it uses a loop, so fewer lines do the same work
- B Program A — more lines means more gets done
- C Program A — loops always run more slowly
- D They are equally efficient because the answer is the same

3 Solve the inequality **$5x + 8 < 43$**. What is the **greatest whole number** value of x? C2.4 · AP

- A 6
- B 8
- C 175
- D 35

4 A class surveys the school by **asking only students who already play an instrument whether music should be compulsory**. What is that? D1.2 · AP

- A a random sample of library users
- B 901
- C the whole population, not a sample
- D a biased sample

5 A rotation of **90° counterclockwise** about a point has the same result as which rotation? E1.4 · AP

- A 90° clockwise
- B 270° counterclockwise
- C 270° clockwise
- D 267

6 A bag holds **20** tiles and **4** are cracked. What is the probability of drawing a cracked tile, in **simplest form**? D2.1 · AP

- A 4/16
- B 4/24
- C 20/4
- D 1/5

7 Evaluate **$2x + 7$** when **$x = 9.1$**. C2.2 · AP

- A 32.2
- B 11.2
- C 18.1
- D 25.2

8 Write **42 917** in **expanded form**. B1.1 · KU

- A $7 \times 1 + 1 \times 10 + 9 \times 100 + 2 \times 1000 + 4 \times 10\,000$
- B $4 \times 10\,000 + 2 \times 1000 + 9 \times 100 + 1 \times 10$
- C $4 \times 10\,000 \times 2 \times 1000 \times 9 \times 100 \times 1 \times 10 \times 7 \times 1$
- D $4 \times 10\,000 + 2 \times 1000 + 9 \times 100 + 1 \times 10 + 7 \times 1$

9 Which describes a **kite**? E1.1 · AP

- A 0 lines of symmetry, rotational order 2
- B 4 lines of symmetry, rotational order 4
- C 1 line of symmetry, rotational order 1
- D 2 lines of symmetry, rotational order 2

10 The Commission budget is written as **482,006**. Which is the value of the digit in the **ten thousands** place? B1.1 · KU

- A 80,000
- B 2,000
- C 8
- D 400,000

11 Write **72** as a product of its **prime factors**. B2.6 · AP

- A 2×3
- B 1×72
- C $2^3 \times 3^2$
- D 2^3

Check before you move on. On the real assessment you can change any answer until you submit the stage.

Paper 4 — Stage 2

Questions 12 to 22. One sitting per stage.

12 A rival proposal shows a graph where **the intervals on the horizontal axis are not equal widths**. Why is this misleading? D1.6 · TH

- A Unequal intervals distort the shape of the data.
- B It exaggerates small differences — the bars look many times taller than each other.
- C Choosing which data to leave out can reverse the apparent trend.
- D Extra dimensions make some bars look bigger than their value.

13 A batch of **240** tiles arrives. **5%** of them are cracked. How many are cracked? B2.3 · AP

- A 120.0
- B 5
- C 24.0
- D 12

14 The studio borrows **$800** at **3%** simple interest for one year. How much interest is owed after one year? F1.4 · AP

- A $3
- B $824
- C $24
- D $2400

15 Two programs both add **3** to a total **5** times.
Program A writes `add 3 to total` out 5 separate times.
Program B writes `repeat 5 times: add 3 to total`.
Which is more **efficient**, and why? C3.2 · TH

- A Program A — loops always run more slowly
- B Program B — it uses a loop, so fewer lines do the same work
- C They are equally efficient because the answer is the same
- D Program A — more lines means more gets done

16 Which number lies between **7.396** and **7.496**? B1.4 · KU

- A 7.376
- B 7.526
- C 7.446
- D 7.296

17 A trapezoid has parallel sides of **10 cm** and **16 cm** and a height of **6 cm**. What is its area? E2.4 · AP

- A 78 cm^2
- B 160 cm^2
- C 156 cm^2
- D 18 cm^2

18 Is **the time taken to lay one row of decking** discrete or continuous data? D1.1 · KU

- A discrete
- B neither
- C continuous
- D qualitative

19 A run of decking is **507 cm** long. The plan calls for **2.9** times that length in total. How long is that? B2.7 · AP

- A 14703 cm
- B 1470.3 cm
- C 509.9 cm
- D 147.03 cm

20 Which of these **is money put in with the aim of growing over time, with some risk**? F1.4 · KU

- A a savings account
- B an investment
- C a chequing account
- D a mortgage

21 Which display **lists each value or interval beside how many times it occurred**? D1.3 · KU

- A line plot
- B frequency table
- C tally table
- D histogram

22 Select the option that is **NOT** equal to **8 thousandths.** B1.6 · AP

- A 8/1000
- B 0.008
- C 0.8
- D 8.000

Check before you move on. On the real assessment you can change any answer until you submit the stage.

Paper 4 — Stage 3

Questions 23 to 33. One sitting per stage.

23 Round **83.188** to the nearest **tenth.** B1.5 · KU

- **A** 83.1
- **B** 83.2
- **C** 83.20
- **D** 84

24 Solve the inequality **2x + 8 < 16**. What is the **greatest whole number** value of x? C2.4 · AP

- **A** 8
- **B** 5
- **C** 3
- **D** 16

25 The **acute** angle between Line A and Line B is **35°**. What is the angle measuring **counterclockwise** from Line A to Line B? E2.2 · AP

- **A** 215°
- **B** 55°
- **C** 325°
- **D** 145°

26 A **kite** has diagonals of **12 cm** and **8 cm**. What is its area? E2.4 · AP

- **A** 20 cm^2
- **B** 96 cm^2
- **C** 48 cm^2
- **D** 40 cm^2

27 A tool costs **$150** and is on sale at **50% off**. What is the sale price? F1.1 · AP

- **A** $100
- **B** $75
- **C** $225
- **D** 667

28 Two lines cross. One angle is **64°**. What is the angle **opposite** it? E2.3 · KU

- **A** 26°
- **B** 64°
- **C** 296°
- **D** 116°

29 Order these from **least to greatest**: **−3 · 3/4 · 1/2 · −1/2** B1.3 · AP

- **A** 3/4, 1/2, −1/2, −3
- **B** 1/2, 3/4, −1/2, −3
- **C** 1/2, −1/2, 3/4, −3
- **D** −3, −1/2, 1/2, 3/4

30 **16** planters are ordered. **4/5** of them are cedar. How many are cedar? B2.9 · AP

- **A** 11
- **B** 64/5
- **C** 20
- **D** 4.0

31 Which shape has **exactly 0** lines of symmetry? E1.1 · KU

- **A** kite
- **B** rectangle
- **C** rhombus
- **D** parallelogram

32 A planter is a rectangular prism **5 cm × 3 cm × 8 cm**. What is its **surface area**? E2.6 · AP

- **A** 120 cm^3
- **B** 79 cm^2
- **C** 32 cm^2
- **D** 158 cm^2

33 Four term values of a growing pattern are shown.
Term number: 3 · 5 · 7 · ?
Term value: 20 · 30 · 40 · 60
What is the **term number** when the term value is 60? C1.3 · AP

- **A** 11
- **B** 13
- **C** 49
- **D** 60

Check before you move on. On the real assessment you can change any answer until you submit the stage.

Paper 4 — Stage 4

Questions 34 to 44. One sitting per stage.

34 Evaluate **7x + 5** when **x = 7.9**. C2.2 · AP

- A 19.9
- B 50.3
- C 90.3
- D 60.3

35 A fair 6-section spinner has one red section. What is the **theoretical** probability of red? D2.2 · KU

- A 1/6
- B 973
- C 6/1
- D 1/20

36 Evaluate **8x + 6** when **x = 5.8**. C2.2 · AP

- A 94.4
- B 52.4
- C 40.4
- D 19.8

37 Work out **1/2 + 3/5**. B2.5 · AP

- A 4/7
- B -1/10
- C 3/10
- D 11/10

38 Two independent events: a fair spinner with **6** equal sections, and a fair 6-sided die. What is the theoretical probability of getting a **specific** result on both? D2.2 · TH

- A 6/6
- B 2/36
- C 1/36
- D 1/12

39 Heights in centimetres: **14, 18, 22, 27, 37, 42, 57**
What is the **median**? D1.5 · TH

- A 31
- B 27
- C 57
- D 43

40 A point moves from **(-2, 4)** to **(-7, -1)**. Describe the translation. E1.3 · AP

- A 10 right
- B 5 left and 5 down
- C 5 right and 5 up
- D 5 left and 5 dow

41 Four term values of a growing pattern are shown.
Term number: 3 · 5 · 7 · ?
Term value: 14 · 20 · 26 · 50
What is the **term number** when the term value is 50? C1.3 · AP

- A 17
- B 15
- C 35
- D 50

42 **64.922 kg** of fixings is shared equally between **2** crates. How much per crate? B2.11 · AP

- A 32.461 kg
- B 62.922 kg
- C 324.61 kg
- D 129.844 kg

43 You need to **borrow $2000** for 2 years. One lender charges **3%** simple interest, another charges **6%**. Which costs less, and by how much? F1.4 · TH

- A They cost the same
- B 3%, by $120
- C 6%, by $120
- D 3%, by $3

44 Select the **TWO** prime numbers. B2.6 · KU

Select **all** that apply.

- A 51
- B 55
- C 43
- D 29
- E 91

Check before you move on. On the real assessment you can change any answer until you submit the stage.

Answers

For checking your own work after you finish. Every answer carries the reason and the expectation code — the code tells you which sheet to go back to.

Sheet 3

1 D — A = b × h [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 126 cm².

2 C — A = c × d ÷ 2 [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 56 cm².

3 A — A = c × d ÷ 2 [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 30 cm².

4 C — A = c × d ÷ 2 [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 56 cm².

5 C — A = c × d ÷ 2 [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 56 cm².

6 B — A = $(b_1 + b_2)$ × h ÷ 2 [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 50 cm².

7 D — A = c × d ÷ 2 [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 30 cm².

8 B — A = $(b_1 + b_2)$ × h ÷ 2 [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 50 cm².

9 C — A = $(b_1 + b_2)$ × h ÷ 2 [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 50 cm².

10 D — A = b × h [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 126 cm².

11 B — A = b × h ÷ 2 [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 56 cm².

12 A — A = $(b_1 + b_2)$ × h ÷ 2 [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 50 cm².

Sheet 4

1 A — 126 cm² [E2.4] · A = b × h uses the **perpendicular** height (9 cm), never the slanted side (11 cm). Multiplying by the slant is the commonest area error there is.

2 C — 126 cm² [E2.4] · A = b × h uses the **perpendicular** height (9 cm), never the slanted side (11 cm). Multiplying by the slant is the commonest area error there is.

3 D — 45 cm² [E2.4] · A = b × h uses the **perpendicular** height (5 cm), never the slanted side (7 cm). Multiplying by the slant is the commonest area error there is.

4 A — 126 cm² [E2.4] · A = b × h uses the **perpendicular** height (9 cm), never the slanted side (11 cm). Multiplying by the slant is the commonest area error there is.

5 A — 126 cm² [E2.4] · A = b × h uses the **perpendicular** height (9 cm), never the slanted side (11 cm). Multiplying by the slant is the commonest area error there is.

6 A — 126 cm² [E2.4] · A = b × h uses the **perpendicular** height (9 cm), never the slanted side (11 cm). Multiplying by the slant is the commonest area error there is.

7 C — 126 cm² [E2.4] · A = b × h uses the **perpendicular** height (9 cm), never the slanted side (11 cm). Multiplying by the slant is the commonest area error there is.

8 A — 60 cm² [E2.4] · A = b × h uses the **perpendicular** height (6 cm), never the slanted side (8 cm). Multiplying by the slant is the commonest area error there is.

9 C — 45 cm² [E2.4] · A = b × h uses the **perpendicular** height (5 cm), never the slanted side (7 cm). Multiplying by the slant is the commonest area error there is.

10 B — 126 cm² [E2.4] · A = b × h uses the **perpendicular** height (9 cm), never the slanted side (11 cm). Multiplying by the slant is the commonest area error there is.

11 B — 126 cm² [E2.4] · A = b × h uses the **perpendicular** height (9 cm), never the slanted side (11 cm). Multiplying by the slant is the commonest area error there is.

12 D — 45 cm² [E2.4] · A = b × h uses the **perpendicular** height (5 cm), never the slanted side (7 cm). Multiplying by the slant is the commonest area error there is.

Sheet 5

1 C — 48 cm^2 [E2.4] · For a rhombus, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $16 \times 6 \div 2 = 48$ cm^2. This formula is printed on your formula sheet.

2 D — 48 cm^2 [E2.4] · For a kite, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $16 \times 6 \div 2 = 48$ cm^2. This formula is printed on your formula sheet.

3 C — 48 cm^2 [E2.4] · For a rhombus, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $12 \times 8 \div 2 = 48$ cm^2. This formula is printed on your formula sheet.

4 A — 70 cm^2 [E2.4] · For a rhombus, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $14 \times 10 \div 2 = 70$ cm^2. This formula is printed on your formula sheet.

5 A — 70 cm^2 [E2.4] · For a rhombus, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $14 \times 10 \div 2 = 70$ cm^2. This formula is printed on your formula sheet.

6 C — 48 cm^2 [E2.4] · For a kite, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $16 \times 6 \div 2 = 48$ cm^2. This formula is printed on your formula sheet.

7 A — 48 cm^2 [E2.4] · For a rhombus, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $12 \times 8 \div 2 = 48$ cm^2. This formula is printed on your formula sheet.

8 A — 70 cm^2 [E2.4] · For a rhombus, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $14 \times 10 \div 2 = 70$ cm^2. This formula is printed on your formula sheet.

9 A — 70 cm^2 [E2.4] · For a kite, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $14 \times 10 \div 2 = 70$ cm^2. This formula is printed on your formula sheet.

10 C — 70 cm^2 [E2.4] · For a kite, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $14 \times 10 \div 2 = 70$ cm^2. This formula is printed on your formula sheet.

11 A — 48 cm^2 [E2.4] · For a rhombus, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $16 \times 6 \div 2 = 48$ cm^2. This formula is printed on your formula sheet.

12 D — 48 cm^2 [E2.4] · For a kite, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $12 \times 8 \div 2 = 48$ cm^2. This formula is printed on your formula sheet.

Generated, not typed. Every numeric answer was computed by the same code that printed the question.

Answers, continued

Sheet 6

1 C — 111 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 12×8 = 96. Triangle 5×6÷2 = 15. Total 111 cm². The triangle is halved; the rectangle is not.

2 B — 82 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 14×5 = 70. Triangle 8×3÷2 = 12. Total 82 cm². The triangle is halved; the rectangle is not.

3 B — 72 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 10×6 = 60. Triangle 6×4÷2 = 12. Total 72 cm². The triangle is halved; the rectangle is not.

4 B — 82 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 14×5 = 70. Triangle 6×4÷2 = 12. Total 82 cm². The triangle is halved; the rectangle is not.

5 B — 82 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 14×5 = 70. Triangle 8×3÷2 = 12. Total 82 cm². The triangle is halved; the rectangle is not.

6 B — 82 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 14×5 = 70. Triangle 8×3÷2 = 12. Total 82 cm². The triangle is halved; the rectangle is not.

7 A — 85 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 14×5 = 70. Triangle 5×6÷2 = 15. Total 85 cm². The triangle is halved; the rectangle is not.

8 C — 82 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 14×5 = 70. Triangle 6×4÷2 = 12. Total 82 cm². The triangle is halved; the rectangle is not.

9 D — 108 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 12×8 = 96. Triangle 6×4÷2 = 12. Total 108 cm². The triangle is halved; the rectangle is not.

10 D — 85 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 14×5 = 70. Triangle 5×6÷2 = 15. Total 85 cm². The triangle is halved; the rectangle is not.

11 A — 111 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 12×8 = 96. Triangle 5×6÷2 = 15. Total 111 cm². The triangle is halved; the rectangle is not.

12 A — 111 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 12×8 = 96. Triangle 5×6÷2 = 15. Total 111 cm². The triangle is halved; the rectangle is not.

Sheet 7

1 D — $2^2 \times 3^2 \times 5$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 180 = $2^2 \times 3^2 \times 5$. Multiply it back to check.

2 A — $2^2 \times 3^2$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 36 = $2^2 \times 3^2$. Multiply it back to check.

3 B — $2^3 \times 3 \times 5$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 120 = $2^3 \times 3 \times 5$. Multiply it back to check.

4 B — $2 \times 3^2 \times 5$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 90 = $2 \times 3^2 \times 5$. Multiply it back to check.

5 A — $2^2 \times 3 \times 11$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 132 = $2^2 \times 3 \times 11$. Multiply it back to check.

6 A — $2^2 \times 3 \times 11$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 132 = $2^2 \times 3 \times 11$. Multiply it back to check.

7 B — $2 \times 3^2 \times 7$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 126 = $2 \times 3^2 \times 7$. Multiply it back to check.

8 A — $2 \times 3 \times 5^2$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 150 = $2 \times 3 \times 5^2$. Multiply it back to check.

9 D — $2 \times 3 \times 5 \times 7$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 210 = $2 \times 3 \times 5 \times 7$. Multiply it back to check.

10 B — $2^2 \times 3^2$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 36 = $2^2 \times 3^2$. Multiply it back to check.

11 D — $2 \times 3^2 \times 5$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 90 = $2 \times 3^2 \times 5$. Multiply it back to check.

12 A — $2^3 \times 3 \times 5$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 120 = $2^3 \times 3 \times 5$. Multiply it back to check.

Sheet 8

1 B — prime [B2.6] · A prime has exactly two factors: 1 and itself.

2 D — prime [B2.6] · A prime has exactly two factors: 1 and itself.

3 C — prime [B2.6] · A prime has exactly two factors: 1 and itself.

4 C — prime [B2.6] · A prime has exactly two factors: 1 and itself.

5 B — composite [B2.6] · 91 is composite — it has a factor other than 1 and itself (7 divides it). Always test 3, 7, 11 and 13.

6 A — prime [B2.6] · A prime has exactly two factors: 1 and itself.

7 C — prime [B2.6] · A prime has exactly two factors: 1 and itself.

8 C — prime [B2.6] · A prime has exactly two factors: 1 and itself.

9 C — composite [B2.6] · 91 is composite — it has a factor other than 1 and itself (7 divides it). Always test 3, 7, 11 and 13.

10 A — prime [B2.6] · A prime has exactly two factors: 1 and itself.

11 B — prime [B2.6] · A prime has exactly two factors: 1 and itself.

12 A — composite [B2.6] · 87 is composite — it has a factor other than 1 and itself (3 divides it). Always test 3, 7, 11 and 13.

Generated, not typed. Every numeric answer was computed by the same code that printed the question.

Answers, continued

Sheet 9

1 C — 3 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A equilateral triangle has order 3. Every shape has order at least 1.

2 A — 6 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A regular hexagon has order 6. Every shape has order at least 1.

3 A — 1 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A isosceles trapezoid has order 1. Every shape has order at least 1.

4 C — 5 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A regular pentagon has order 5. Every shape has order at least 1.

5 A — 1 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A kite has order 1. Every shape has order at least 1.

6 D — 2 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A rectangle has order 2. Every shape has order at least 1.

7 C — 2 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A rhombus has order 2. Every shape has order at least 1.

8 B — 2 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A rhombus has order 2. Every shape has order at least 1.

9 A — 6 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A regular hexagon has order 6. Every shape has order at least 1.

10 D — 3 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A equilateral triangle has order 3. Every shape has order at least 1.

11 A — 6 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A regular hexagon has order 6. Every shape has order at least 1.

12 A — 3 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A equilateral triangle has order 3. Every shape has order at least 1.

Sheet 10

1 A — 4 lines of symmetry, rotational order 4 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A square has 4 folds and looks the same 4 times in a full turn. A parallelogram is the catch — no folds, but order 2.

2 C — 1 line of symmetry, rotational order 1 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A isosceles trapezoid has 1 fold and looks the same 1 time in a full turn. A parallelogram is the catch — no folds, but order 2.

3 D — 1 line of symmetry, rotational order 1 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A isosceles trapezoid has 1 fold and looks the same 1 time in a full turn. A parallelogram is the catch — no folds, but order 2.

4 C — 1 line of symmetry, rotational order 1 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A kite has 1 fold and looks the same 1 time in a full turn. A parallelogram is the catch — no folds, but order 2.

5 B — 0 lines of symmetry, rotational order 2 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A parallelogram has 0 folds and looks the same 2 times in a full turn. A parallelogram is the catch — no folds, but order 2.

6 A — 0 lines of symmetry, rotational order 2 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A parallelogram has 0 folds and looks the same 2 times in a full turn. A parallelogram is the catch — no folds, but order 2.

7 B — 2 lines of symmetry, rotational order 2 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A rhombus has 2 folds and looks the same 2 times in a full turn. A parallelogram is the catch — no folds, but order 2.

8 A — 2 lines of symmetry, rotational order 2 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A rectangle has 2 folds and looks the same 2 times in a full turn. A parallelogram is the catch — no folds, but order 2.

9 C — 2 lines of symmetry, rotational order 2 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A rhombus has 2 folds and looks the same 2 times in a full turn. A parallelogram is the catch — no folds, but order 2.

10 C — 2 lines of symmetry, rotational order 2 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A rhombus has 2 folds and looks the same 2 times in a full turn. A parallelogram is the catch — no folds, but order 2.

11 B — 1 line of symmetry, rotational order 1 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A kite has 1 fold and looks the same 1 time in a full turn. A parallelogram is the catch — no folds, but order 2.

12 C — 4 lines of symmetry, rotational order 4 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A square has 4 folds and looks the same 4 times in a full turn. A parallelogram is the catch — no folds, but order 2.

Sheet 11

1 C — (-7, 7) [E1.4] · Reflecting in the y-axis flips the sign of the x-coordinate and leaves the other one alone.

2 A — (1, -3) [E1.4] · Reflecting in the x-axis flips the sign of the y-coordinate and leaves the other one alone.

3 D — (-5, 5) [E1.4] · Reflecting in the y-axis flips the sign of the x-coordinate and leaves the other one alone.

4 A — (6, -6) [E1.4] · Reflecting in the x-axis flips the sign of the y-coordinate and leaves the other one alone.
5 A — (-5, 2) [E1.4] · Reflecting in the y-axis flips the sign of the x-coordinate and leaves the other one alone.
6 D — (3, -2) [E1.4] · Reflecting in the x-axis flips the sign of the y-coordinate and leaves the other one alone.
7 C — (-6, 4) [E1.4] · Reflecting in the y-axis flips the sign of the x-coordinate and leaves the other one alone.
8 A — (1, -6) [E1.4] · Reflecting in the x-axis flips the sign of the y-coordinate and leaves the other one alone.
9 D — (-4, 5) [E1.4] · Reflecting in the y-axis flips the sign of the x-coordinate and leaves the other one alone.
10 D — (-1, 2) [E1.4] · Reflecting in the y-axis flips the sign of the x-coordinate and leaves the other one alone.
11 B — (-7, 5) [E1.4] · Reflecting in the y-axis flips the sign of the x-coordinate and leaves the other one alone.
12 A — (-8, 5) [E1.4] · Reflecting in the y-axis flips the sign of the x-coordinate and leaves the other one alone.

Generated, not typed. **Every numeric answer was computed by the same code that printed the question.**

Answers, continued

Sheet 12

1 C — the shape is back exactly where it started [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

2 B — the shape is on the other side, 3 units from where it started [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

3 C — the same result as a single reflection in the x-axis [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

4 A — the same result as a single reflection in the x-axis [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

5 C — the same result as a single reflection in the x-axis [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

6 C — the shape is on the other side, 3 units from where it started [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

7 A — the shape is back exactly where it started [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

8 D — the shape is back exactly where it started [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

9 D — the shape is back exactly where it started [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

10 D — the shape is on the other side, 3 units from where it started [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

11 B — the shape is on the other side, 3 units from where it started [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

12 D — the shape is on the other side, 3 units from where it started [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

Sheet 13

1 C — 29 [D1.3] · The stem is the tens digit and each leaf is a ones digit. Stem 2, leaf 9 means 29 — not 9.

2 B — 48 [D1.3] · The stem is the tens digit and each leaf is a ones digit. Stem 4, leaf 8 means 48 — not 8.

3 A — 43.5 [D1.3] · A stem-and-leaf plot is already in order, which is why it is handy for finding a median. Count in from both ends.

4 D — 5 [D1.3] · Count the leaves, not the stems. Each leaf is one value.

5 C — 5 [D1.3] · Count the leaves, not the stems. Each leaf is one value.

6 D — 45.5 [D1.3] · A stem-and-leaf plot is already in order, which is why it is handy for finding a median. Count in from both ends.

7 B — 5 [D1.3] · Count the leaves, not the stems. Each leaf is one value.

8 B — 5 [D1.3] · Count the leaves, not the stems. Each leaf is one value.

9 D — 55 [D1.3] · A stem-and-leaf plot is already in order, which is why it is handy for finding a median. Count in from both ends.

10 D — 44.5 [D1.3] · A stem-and-leaf plot is already in order, which is why it is handy for finding a median. Count in from both ends.

11 A — 5 [D1.3] · Count the leaves, not the stems. Each leaf is one value.

12 A — 39 [D1.3] · The stem is the tens digit and each leaf is a ones digit. Stem 3, leaf 9 means 39 — not 9.

Sheet 14

1 A — line plot [D1.3] · A line plot stacks an X above each value on a number line, so the shape of the data shows. All three appear in the EQAO glossary, so all three can turn up.

2 C — line plot [D1.3] · A line plot stacks an X above each value on a number line, so the shape of the data shows. All three appear in the EQAO glossary, so all three can turn up.

3 D — line plot [D1.3] · A line plot stacks an X above each value on a number line, so the shape of the data shows. All three appear in the EQAO glossary, so all three can turn up.

4 D — line plot [D1.3] · A line plot stacks an X above each value on a number line, so the shape of the data shows. All three appear in the EQAO glossary, so all three can turn up.

5 B — frequency table [D1.3] · A frequency table lists each value or interval beside how many times it occurred. All three appear in the EQAO glossary, so all three can turn up.

6 B — frequency table [D1.3] · A frequency table lists each value or interval beside how many times it occurred. All three appear in the EQAO glossary, so all three can turn up.

7 A — tally table [D1.3] · A tally table records each observation with a stroke, grouped in fives. All three appear in the EQAO glossary, so all three can turn up.

8 C — frequency table [D1.3] · A frequency table lists each value or interval beside how many times it occurred. All three appear in the EQAO glossary, so all three can turn up.

9 B — line plot [D1.3] · A line plot stacks an X above each value on a number line, so the shape of the data shows. All three appear in the EQAO glossary, so all three can turn up.

10 B — frequency table [D1.3] · A frequency table lists each value or interval beside how many times it occurred. All three appear in the EQAO glossary, so all three can turn up.

11 A — frequency table [D1.3] · A frequency table lists each value or interval beside how many times it occurred. All three appear in the EQAO glossary, so all three can turn up.

12 D — tally table [D1.3] · A tally table records each observation with a stroke, grouped in fives. All three appear in the EQAO glossary, so all three can turn up.

Generated, not typed. **Every numeric answer was computed by the same code that printed the question.**

Answers, continued

Sheet 15

1 B — a random sample of library users [D1.2] · It gives each library user an equal chance of being picked. A sample only works if it represents the whole population.

2 B — tell a story about the data using graphs, numbers and other relevant information together [D1.4] · An infographic combines more than one representation — a table, a graph, a headline figure — to make a point. It still needs proper sources, titles, labels and scales.

3 A — the whole population, not a sample [D1.2] · If you ask everyone, it is a census rather than a sample. A sample only works if it represents the whole population.

4 A — tell a story about the data using graphs, numbers and other relevant information together [D1.4] · An infographic combines more than one representation — a table, a graph, a headline figure — to make a point. It still needs proper sources, titles, labels and scales.

5 B — a random sample of library users [D1.2] · It gives each library user an equal chance of being picked. A sample only works if it represents the whole population.

6 C — tell a story about the data using graphs, numbers and other relevant information together [D1.4] · An infographic combines more than one representation — a table, a graph, a headline figure — to make a point. It still needs proper sources, titles, labels and scales.

7 D — a random sample of library users [D1.2] · It gives each library user an equal chance of being picked. A sample only works if it represents the whole population.

8 A — tell a story about the data using graphs, numbers and other relevant information together [D1.4] · An infographic combines more than one representation — a table, a graph, a headline figure — to make a point. It still needs proper sources, titles, labels and scales.

9 A — a biased sample [D1.2] · Friends are more likely to share your views, so the result will not represent the school. A sample only works if it represents the whole population.

10 C — tell a story about the data using graphs, numbers and other relevant information together [D1.4] · An infographic combines more than one representation — a table, a graph, a headline figure — to make a point. It still needs proper sources, titles, labels and scales.

11 C — a biased sample [D1.2] · The group chosen already has a stake in the answer. A sample only works if it represents the whole population.

12 D — tell a story about the data using graphs, numbers and other relevant information together [D1.4] · An infographic combines more than one representation — a table, a graph, a headline figure — to make a point. It still needs proper sources, titles, labels and scales.

Sheet 16

1 A — 7/40 [D2.2] · Experimental probability comes from what actually happened: 7 out of 40. Theoretical probability comes from the design: 1/6.

2 D — 1/6 [D2.2] · Theoretical probability is worked out from the design, not from any trial: 1 red section out of 6 = 1/6.

3 B — 4/20 [D2.2] · Experimental probability comes from what actually happened: 4 out of 20. Theoretical probability comes from the design: 1/6.

4 D — Random variation — a finite number of trials rarely matches the theory exactly [D2.2] · They are measuring different things. The more trials you run, the closer the experimental value usually gets to the theoretical one — but it need not ever match exactly.

5 B — Random variation — a finite number of trials rarely matches the theory exactly [D2.2] · They are measuring different things. The more trials you run, the closer the experimental value usually gets to the theoretical one — but it need not ever match exactly.

6 C — 9/50 [D2.2] · Experimental probability comes from what actually happened: 9 out of 50. Theoretical probability comes from the design: 1/6.

7 B — 1/2 [D2.2] · Theoretical probability is worked out from the design, not from any trial: 1 red section out of 2 = 1/2.

8 D — 31/50 [D2.2] · Experimental probability comes from what actually happened: 31 out of 50. Theoretical probability comes from the design: 1/2.

9 D — 1/4 [D2.2] · Theoretical probability is worked out from the design, not from any trial: 1 red section out of 4 = 1/4.

10 D — 13/50 [D2.2] · Experimental probability comes from what actually happened: 13 out of 50. Theoretical probability comes from the design: 1/6.

11 A — 1/2 [D2.2] · Theoretical probability is worked out from the design, not from any trial: 1 red section out of 2 = 1/2.

12 B — 7/20 [D2.2] · Experimental probability comes from what actually happened: 7 out of 20. Theoretical probability comes from the design: 1/4.

Sheet 17

1 D — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 30. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 6 then means editing one number instead of 6 lines.

2 A — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 100. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 10 then means editing one number instead of 10 lines.

3 C — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 60. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 6 then means editing one number instead of 6 lines.

4 B — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 25. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 5 then means editing one number instead of 5 lines.

5 B — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 30. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 10 then means editing one number instead of 10 lines.

6 C — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 40. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 4 then means editing one number instead of 4 lines.

7 D — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 100. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 10 then means editing one number instead of 10 lines.

8 D — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 25. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 5 then means editing one number instead of 5 lines.

9 A — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 18. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 6 then means editing one number instead of 6 lines.

10 B — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 20. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 4 then means editing one number instead of 4 lines.

11 D — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 60. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 6 then means editing one number instead of 6 lines.

12 A — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 15. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 5 then means editing one number instead of 5 lines.

Generated, not typed. **Every numeric answer was computed by the same code that printed the question.**

Answers, continued

Sheet 18

1 D — 24 [C3.2] · Before: 2 + (8 × 2) = 18. After: 2 + (11 × 2) = 24. Reading and altering existing code is expectation C3.2.
2 C — 44 [C3.2] · Before: 9 + (6 × 5) = 39. After: 9 + (7 × 5) = 44. Reading and altering existing code is expectation C3.2.
3 B — 26 [C3.2] · Before: 8 + (5 × 3) = 23. After: 8 + (6 × 3) = 26. Reading and altering existing code is expectation C3.2.
4 D — 27 [C3.2] · Before: 7 + (7 × 2) = 21. After: 7 + (10 × 2) = 27. Reading and altering existing code is expectation C3.2.
5 D — 45 [C3.2] · Before: 0 + (8 × 5) = 40. After: 0 + (9 × 5) = 45. Reading and altering existing code is expectation C3.2.
6 A — 18 [C3.2] · Before: 3 + (3 × 3) = 12. After: 3 + (5 × 3) = 18. Reading and altering existing code is expectation C3.2.
7 B — 25 [C3.2] · Before: 9 + (7 × 2) = 23. After: 9 + (8 × 2) = 25. Reading and altering existing code is expectation C3.2.
8 A — 35 [C3.2] · Before: 5 + (7 × 3) = 26. After: 5 + (10 × 3) = 35. Reading and altering existing code is expectation C3.2.
9 B — 68 [C3.2] · Before: 8 + (8 × 5) = 48. After: 8 + (12 × 5) = 68. Reading and altering existing code is expectation C3.2.
10 D — 27 [C3.2] · Before: 0 + (5 × 3) = 15. After: 0 + (9 × 3) = 27. Reading and altering existing code is expectation C3.2.
11 A — 65 [C3.2] · Before: 10 + (7 × 5) = 45. After: 10 + (11 × 5) = 65. Reading and altering existing code is expectation C3.2.
12 D — 26 [C3.2] · Before: 4 + (8 × 2) = 20. After: 4 + (11 × 2) = 26. Reading and altering existing code is expectation C3.2.

Sheet 19

1 A — $54 [F1.1] · 10% of $60 = $6 — that is the discount, not the price. Subtract it: $60 − $6 = $54. Answering with the discount is the trap.
2 C — $120 [F1.1] · 20% of $150 = $30 — that is the discount, not the price. Subtract it: $150 − $30 = $120. Answering with the discount is the trap.
3 D — $170 [F1.1] · 15% of $200 = $30 — that is the discount, not the price. Subtract it: $200 − $30 = $170. Answering with the discount is the trap.
4 A — $30 [F1.1] · 25% of $40 = $10 — that is the discount, not the price. Subtract it: $40 − $10 = $30. Answering with the discount is the trap.
5 A — $48 [F1.1] · 20% of $60 = $12 — that is the discount, not the price. Subtract it: $60 − $12 = $48. Answering with the discount is the trap.
6 A — $135 [F1.1] · 10% of $150 = $15 — that is the discount, not the price. Subtract it: $150 − $15 = $135. Answering with the discount is the trap.
7 D — $75 [F1.1] · 50% of $150 = $75 — that is the discount, not the price. Subtract it: $150 − $75 = $75. Answering with the discount is the trap.
8 A — $113 [F1.1] · 25% of $150 = $37 — that is the discount, not the price. Subtract it: $150 − $37 = $113. Answering with the discount is the trap.
9 A — $100 [F1.1] · 50% of $200 = $100 — that is the discount, not the price. Subtract it: $200 − $100 = $100. Answering with the discount is the trap.
10 B — $40 [F1.1] · 50% of $80 = $40 — that is the discount, not the price. Subtract it: $80 − $40 = $40. Answering with the discount is the trap.
11 A — $135 [F1.1] · 10% of $150 = $15 — that is the discount, not the price. Subtract it: $150 − $15 = $135. Answering with the discount is the trap.
12 A — $60 [F1.1] · 25% of $80 = $20 — that is the discount, not the price. Subtract it: $80 − $20 = $60. Answering with the discount is the trap.

Sheet 20

1 A — is a long-term loan used to buy property [F1.4] · A mortgage is a long-term loan used to buy property.
2 C — a loan [F1.4] · A loan is money borrowed that must be repaid, usually with interest.
3 B — is money borrowed that must be repaid, usually with interest [F1.4] · A loan is money borrowed that must be repaid, usually with interest.
4 A — usually pays interest to you, but is meant for money you leave alone [F1.4] · A savings account usually pays interest to you, but is meant for money you leave alone.
5 A — is for everyday spending, and usually pays little or no interest [F1.4] · A chequing account is for everyday spending, and usually pays little or no interest.
6 B — is money borrowed that must be repaid, usually with interest [F1.4] · A loan is money borrowed that must be repaid, usually with interest.
7 D — a savings account [F1.4] · A savings account usually pays interest to you, but is meant for money you leave alone.
8 C — is for everyday spending, and usually pays little or no interest [F1.4] · A chequing account is for everyday spending, and usually pays little or no interest.
9 A — a savings account [F1.4] · A savings account usually pays interest to you, but is meant for money you leave alone.
10 A — is a long-term loan used to buy property [F1.4] · A mortgage is a long-term loan used to buy property.
11 B — is a long-term loan used to buy property [F1.4] · A mortgage is a long-term loan used to buy property.
12 B — is money borrowed that must be repaid, usually with interest [F1.4] · A loan is money borrowed that must be repaid, usually with interest.

Generated, not typed. Every numeric answer was computed by the same code that printed the question.

Answers, continued

Sheet 21

1 B — fees [F1.2] · Fees: charges a bank or service makes for using an account or a card.
2 C — income [F1.2] · Income: money coming in, from work or other sources.
3 A — income [F1.2] · Income: money coming in, from work or other sources.
4 C — income [F1.2] · Income: money coming in, from work or other sources.
5 A — income [F1.2] · Income: money coming in, from work or other sources.
6 B — fees [F1.2] · Fees: charges a bank or service makes for using an account or a card.
7 C — interest earned [F1.2] · Interest earned: money a bank pays you for keeping savings with them.
8 D — interest earned [F1.2] · Interest earned: money a bank pays you for keeping savings with them.
9 B — interest earned [F1.2] · Interest earned: money a bank pays you for keeping savings with them.
10 D — budget [F1.2] · Budget: a plan for what money comes in and where it goes.
11 A — income [F1.2] · Income: money coming in, from work or other sources.
12 A — fees [F1.2] · Fees: charges a bank or service makes for using an account or a card.

Sheet 22

1 D — 2%, by $60 [F1.4] · At 4%: $120. At 2%: $60. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.
2 B — 5%, by $30 [F1.4] · At 6%: $180. At 5%: $150. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.
3 A — 4%, by $160 [F1.4] · At 4%: $160. At 8%: $320. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.
4 D — 2%, by $96 [F1.4] · At 8%: $128. At 2%: $32. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.
5 C — 4%, by $20 [F1.4] · At 4%: $80. At 5%: $100. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.
6 B — 5%, by $5 [F1.4] · At 6%: $30. At 5%: $25. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.
7 B — 4%, by $20 [F1.4] · At 4%: $40. At 6%: $60. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.
8 C — 3%, by $25 [F1.4] · At 8%: $40. At 3%: $15. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.
9 B — 2%, by $30 [F1.4] · At 2%: $20. At 5%: $50. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.
10 D — 3%, by $75 [F1.4] · At 8%: $120. At 3%: $45. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.
11 C — 2%, by $120 [F1.4] · At 2%: $40. At 8%: $160. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.
12 C — 5%, by $40 [F1.4] · At 6%: $240. At 5%: $200. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.

Sheet 23

1 D — 1 × 100 000 + 9 × 10 000 + 8 × 10 + 1 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.
2 B — 8 × 100 000 + 2 × 10 000 + 9 × 100 + 5 × 10 + 5 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.
3 B — 8 × 100 000 + 9 × 10 000 + 8 × 1000 + 3 × 100 + 8 × 10 + 6 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.
4 D — 8 × 100 000 + 7 × 10 000 + 9 × 1000 + 7 × 10 + 8 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.
5 C — 3 × 100 000 + 9 × 10 000 + 7 × 1000 + 3 × 100 + 2 × 10 + 1 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.
6 B — 1 × 100 000 + 8 × 10 000 + 1 × 1000 + 5 × 100 + 1 × 10 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.
7 B — 9 × 100 000 + 1 × 10 000 + 5 × 10 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.

8 C — 4 × 10 000 + 2 × 1000 + 2 × 100 + 2 × 10 + 8 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.

9 B — 1 × 100 000 + 5 × 10 000 + 9 × 1000 + 6 × 100 + 8 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.

10 A — 8 × 100 000 + 9 × 10 000 + 7 × 1000 + 3 × 100 + 6 × 10 + 7 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.

11 D — 6 × 100 000 + 4 × 10 000 + 9 × 1000 + 8 × 100 + 7 × 10 + 3 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.

12 C — 5 × 100 000 + 7 × 10 000 + 4 × 1000 + 9 × 100 + 6 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.

Generated, not typed. Every numeric answer was computed by the same code that printed the question.

Answers, continued

Sheet 24

1 D — −1, 0.2, 1/2, 3/4 [B1.3] · Turn every one into a decimal first. Negatives are always smaller than positives.

2 A — 60 shapes per minute [B2.12] · Two steps. Find the FIRST rate, then double it. Do not double the total first and stop — that was the commonest error on this question.

3 C — -1/3 [B2.5] · Find a common denominator first — 8 and 12 both go into 24. Never add the denominators.

4 B — −1, 0.2, 1/4, 1/2 [B1.3] · Turn every one into a decimal first. Negatives are always smaller than positives.

5 C — 60 shapes per minute [B2.12] · Two steps. Find the FIRST rate, then double it. Do not double the total first and stop — that was the commonest error on this question.

6 C — 1/15 [B2.5] · Find a common denominator first — 3 and 10 both go into 30. Never add the denominators.

7 C — −3, 1/2, 0.75, 3/4 [B1.3] · Turn every one into a decimal first. Negatives are always smaller than positives.

8 D — 15 [B2.12] · 25% means 25 out of every 100.

9 B — 3/10 [B2.5] · Find a common denominator first — 2 and 10 both go into 10. Never add the denominators.

10 A — −3, −1, 0.75, 2 [B1.3] · Turn every one into a decimal first. Negatives are always smaller than positives.

11 B — 30 [B2.12] · 15% means 15 out of every 100.

12 C — 11/8 [B2.5] · Find a common denominator first — 2 and 8 both go into 8. Never add the denominators.

Sheet 25

Glossary Self-check both directions. No fixed answers — the definitions are on the sheet itself.

Sheet 26

Glossary Self-check both directions. No fixed answers — the definitions are on the sheet itself.

Sheet 27

Glossary Self-check both directions. No fixed answers — the definitions are on the sheet itself.

Sheet 28

1 B — 3 [B2.3] · 1% of 300: find 10% first (30), then adjust.

2 B — 27.98 [B2.4] · Line up the decimal points, not the last digits.

3 D — 29/24 [B2.5] · Find a common denominator first — 8 and 6 both go into 24. Never add the denominators.

4 A — 21 [C3.2] · Before: 0 + (5 × 3) = 15. After: 0 + (7 × 3) = 21. Reading and altering existing code is expectation C3.2.

5 B — linear growing — it goes up by the same amount each time [C1.1] · Linear means a constant jump. Check the gap between every pair, not just the first.

6 A — 38 [D1.5] · Range = largest − smallest. Median = the middle one once they are in order. Mean = add them all and divide by how many.

7 D — It exaggerates small differences — the bars look many times taller than each other. [D1.6] · Always read the axis before the bars.

8 D — 2 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A rectangle has order 2. Every shape has order at least 1.

9 D — 1 line of symmetry, rotational order 1 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A isosceles trapezoid has 1 fold and looks the same 1 time in a full turn. A parallelogram is the catch — no folds, but order 2.

10 A — a factor that interferes with a goal [F1.2] · Separate the goal itself from the things that help or hinder it.

Sheet 29

1 D — 21 kg [B2.12] · Sand went up by a factor of 3, so cement must too.

2 D — 124 [B2.1] · Two operations, in order. Multiply first, then subtract.

3 D — $2^3 \times 3 \times 5$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. $120 = 2^3 \times 3 \times 5$. Multiply it back to check.

4 D — 4p = 212 [C2.3] · Solve every single one before choosing. Two of these are within a couple of units of each other, and nearly half of students at Level 2 picked the wrong one of the pair.

5 D — 6 [C2.4] · Solve as if it were an equation, then check whether the boundary value itself works.

6 D — tell a story about the data using graphs, numbers and other relevant information together [D1.4] · An infographic combines more than one representation — a table, a graph, a headline figure — to make a point. It still needs proper sources, titles, labels and scales.

7 B — Random variation — a finite number of trials rarely matches the theory exactly [D2.2] · They are measuring different things. The more trials you run, the closer the experimental value usually gets to the theoretical one — but it need not ever match exactly.

8 B — 3 right and 5 down [E1.3] · Subtract the start from the finish. x controls left/right, y controls up/down. Watch the signs in the negative quadrants.

9 C — 90° counterclockwise [E1.4] · A full turn is 360°. Going 270° one way is the same as going 90° the other way.

10 B — cash [F1.1] · Know the trade-off attached to each method.

Generated, not typed. **Every numeric answer was computed by the same code that printed the question.**

Answers, continued

Sheet 30

1 C — −1, 1/2, 3/4, 1.5 [B1.3] · Turn every one into a decimal first. Negatives are always smaller than positives.

2 C — 8.216 [B1.4] · Line the decimals up by place value. Compare tenths, then hundredths, then thousandths.

3 A — 50 [B1.5] · Look only at the digit immediately to the right of the place you are rounding to.

4 B — 15 [C1.3] · The term value goes up 5 each time the term number goes up 2, so the rule is value = 5 × term + 5. Solve for the TERM NUMBER — the commonest error is giving another term value instead.

5 A — 19 [C1.3] · Write out the first six terms of each pattern, then look for the number in all three lists. Do not stop at the first pattern.

6 C — 1/4 [D2.2] · For two independent events, multiply the probabilities.

7 C — 4 [D1.3] · Count the leaves, not the stems. Each leaf is one value.

8 B — 126 cm^2 [E2.6] · Six faces, in three matching pairs. Find the area of three different faces, add them, then double. Surface area is cm^2, not cm^3.

9 B — A = c × d ÷ 2 [E2.4] · The formula sheet gives you all six area formulas — you never have to remember them. The mark is for choosing the right one. Here the area is 56 cm^2.

10 A — 3%, by $30 [F1.4] · At 3%: $90. At 4%: $120. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.

Sheet 31

1 B — 37.10 [B2.4] · Line up the decimal points, not the last digits.

2 A — 7/5 [B2.5] · Find a common denominator first — 10 and 2 both go into 10. Never add the denominators.

3 A — 1995.2 cm [B2.7] · Multiply as whole numbers, then put back one decimal place.

4 B — has a digit sum divisible by 9 [C3.1] · Divisible by 9 exactly when it has a digit sum divisible by 9. A condition that is only *sometimes* true is not a rule.

5 A — 90 [C3.2] · The loop runs 8 times, adding 10 each time: 10 + (8 × 10).

6 D — bar graph [D1.3] · Separate, unrelated categories means a bar graph with gaps between the bars. This was the hardest question on the released set — only 37% of students at Level 3, and 56% at Level 4, chose correctly.

7 A — 36 [D1.5] · Range = largest − smallest. Median = the middle one once they are in order. Mean = add them all and divide by how many.

8 C — (7, -5) [E1.4] · Reflecting in the x-axis flips the sign of the y-coordinate and leaves the other one alone.

9 A — the shape is on the other side, 3 units from where it started [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.

10 D — budget [F1.2] · Budget: a plan for what money comes in and where it goes.

Sheet 32

1 A — 92 [B2.1] · Two operations, in order. Multiply first, then subtract.

2 A — $2^2 \times 5 \times 7$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. 140 = $2^2 \times 5 \times 7$. Multiply it back to check.

3 C — composite [B2.6] · 63 is composite — it has a factor other than 1 and itself (3 divides it). Always test 3, 7, 11 and 13.

4 D — 11x [C2.1] · Like terms add. The x stays an x — it does not become x^2.

5 A — 52.3 [C2.2] · Multiply before you add. Order of operations.

6 A — the whole population, not a sample [D1.2] · If you ask everyone, it is a census rather than a sample. A sample only works if it represents the whole population.

7 C — tell a story about the data using graphs, numbers and other relevant information together [D1.4] · An infographic combines more than one representation — a table, a graph, a headline figure — to make a point. It still needs proper sources, titles, labels and scales.

8 B — 0.025 m^2 [E2.1] · There are 10000 cm^2 in 1 m^2, so divide.

9 C — 312° [E2.2] · Clockwise gives 48°. A full turn is 360°, so counterclockwise is 360 − 48 = 312°. Only 26% of students at Level 2 got this.

10 A — a chequing account [F1.4] · A chequing account is for everyday spending, and usually pays little or no interest.

Sheet 33

1 B — 8.345 [B1.4] · Line the decimals up by place value. Compare tenths, then hundredths, then thousandths.

2 C — 37.7 [B1.5] · Look only at the digit immediately to the right of the place you are rounding to.

3 C — 0.09 [B1.6] · 9 tenths written as a decimal is 0.9. Count the places carefully — a third of students at Level 3 got the equivalent of this wrong.

4 B — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 25. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 5 then means editing one number instead of 5 lines.

5 C — 14 [C3.2] · Before: 2 + (5 × 2) = 12. After: 2 + (6 × 2) = 14. Reading and altering existing code is expectation C3.2.

6 B — 40% [D2.1] · 4 out of 10 = 2/5. Turn that into hundredths.

7 B — 1/4 [D2.2] · For two independent events, multiply the probabilities.

8 C — 160 cm^2 [E2.4] · $A = b \times h$ uses the **perpendicular** height (10 cm), never the slanted side (13 cm). Multiplying by the slant is the commonest area error there is.

9 A — 36 cm^2 [E2.4] · For a kite, $A = c \times d \div 2$ where c and d are the **diagonals**, not the sides. $9 \times 8 \div 2 = 36$ cm^2. This formula is printed on your formula sheet.

10 C — $102 [F1.1] · 15% of $120 = $18 — that is the discount, not the price. Subtract it: $120 − $18 = $102. Answering with the discount is the trap.

Generated, not typed. Every numeric answer was computed by the same code that printed the question.

Answers, continued

Sheet 34

1 A — 5/6 [B2.5] · Find a common denominator first — 2 and 3 both go into 6. Never add the denominators.

2 C — 1073.1 cm [B2.7] · Multiply as whole numbers, then put back one decimal place.

3 B — 73.3 [B2.8] · Dividing by 0.3 makes the answer bigger, not smaller. Multiply both numbers by 10 first: 220 ÷ 3.

4 B — 10 [C2.3] · Undo the + 18 first, then undo the × 3.

5 D — 3p = 129 [C2.3] · Solve every single one before choosing. Two of these are within a couple of units of each other, and nearly half of students at Level 2 picked the wrong one of the pair.

6 A — continuous [D1.1] · Continuous data is measured and can take any value in between — including fractions.

7 C — broken-line graph [D1.3] · A broken-line graph shows change in one continuous quantity over time. This was the hardest question on the released set — only 37% of students at Level 3, and 56% at Level 4, chose correctly.

8 D — trapezoid [E1.1] · Fold it in half. A square has 4, a rectangle and a rhombus have 2, a kite has 1, a parallelogram has 0. Only 48% of students at Level 3 got the rhombus version right.

9 C — neither equal nor bisecting [E1.1] · Draw both diagonals and check three things: equal length, right angles, and whether each cuts the other in half.

10 A — trading [F1.5] · Four different ways resources move between people.

Sheet 35

1 A — $2^2 \times 5 \times 7$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. $140 = 2^2 \times 5 \times 7$. Multiply it back to check.

2 C — composite [B2.6] · 77 is composite — it has a factor other than 1 and itself (7 divides it). Always test 3, 7, 11 and 13.

3 D — 4 × 100 000 + 5 × 10 000 + 3 × 1000 + 1 × 100 + 8 × 10 + 3 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.

4 D — linear growing — it goes up by the same amount each time [C1.1] · Linear means a constant jump. Check the gap between every pair, not just the first.

5 A — 13 [C1.3] · The term value goes up 3 each time the term number goes up 2, so the rule is value = 3 × term + 5. Solve for the TERM NUMBER — the commonest error is giving another term value instead.

6 A — tally table [D1.3] · A tally table records each observation with a stroke, grouped in fives. All three appear in the EQAO glossary, so all three can turn up.

7 A — the whole population, not a sample [D1.2] · If you ask everyone, it is a census rather than a sample. A sample only works if it represents the whole population.

8 B — 66° [E2.3] · Opposite (vertical) angles are equal.

9 A — 150 cm² [E2.4] · Decompose: whole rectangle 15×12 = 180, minus the notch 5×6 = 30. Only 39% of students at Level 3 handled a composite area correctly.

10 C — $24 [F1.4] · 6% of $400. Interest is the cost of borrowing — it is on top of what you repay.

Sheet 36

1 C — 12.33 [B1.5] · Look only at the digit immediately to the right of the place you are rounding to.

2 C — 0.07 [B1.6] · 7 tenths written as a decimal is 0.7. Count the places carefully — a third of students at Level 3 got the equivalent of this wrong.

3 C — 882 [B2.2] · Divisible by 9 when the digit sum is divisible by 9.

4 B — 13 [C2.4] · Solve as if it were an equation, then check whether the boundary value itself works.

5 D — has a digit sum divisible by 9 [C3.1] · Divisible by 9 exactly when it has a digit sum divisible by 9. A condition that is only *sometimes* true is not a rule.

6 D — It exaggerates small differences — the bars look many times taller than each other. [D1.6] · Always read the axis before the bars.

7 D — 1/10 [D2.1] · Reduce by the highest common factor.

8 C — 82 cm² [E2.4] · Decompose into shapes on the formula sheet. Rectangle 14×5 = 70. Triangle 8×3÷2 = 12. Total 82 cm². The triangle is halved; the rectangle is not.

9 C — 1 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A isosceles trapezoid has order 1. Every shape has order at least 1.

10 B — a factor that interferes with a goal [F1.2] · Separate the goal itself from the things that help or hinder it.

Sheet 37

1 D — 3726.2 cm [B2.7] · Multiply as whole numbers, then put back one decimal place.

2 B — 80 [B2.8] · Dividing by 0.5 makes the answer bigger, not smaller. Multiply both numbers by 10 first: 400 ÷ 5.

3 A — 120 [B2.10] · Dividing by a fraction smaller than 1 gives MORE pieces, not fewer.

4 B — 15 [C1.3] · Write out the first six terms of each pattern, then look for the number in all three lists. Do not stop at the first pattern.

5 A — 9x [C2.1] · Like terms add. The x stays an x — it does not become x^2.

6 A — 1/2 [D2.2] · Theoretical probability is worked out from the design, not from any trial: 1 red section out of 2 = 1/2.

7 B — continuous [D1.1] · Continuous data is measured and can take any value in between — including fractions.

8 B — a rectangular prism [E1.2] · Take each view one at a time and rule solids out.

9 B — 1 right and 5 up [E1.3] · Subtract the start from the finish. x controls left/right, y controls up/down. Watch the signs in the negative quadrants.

10 D — takes the money straight from your own bank account [F1.1] · Know the trade-off attached to each method.

Generated, not typed. **Every numeric answer was computed by the same code that printed the question.**

Answers, continued

Sheet 38

1 B — prime [B2.6] · A prime has exactly two factors: 1 and itself.

2 B — 2 × 100 000 + 9 × 10 000 + 5 × 1000 + 6 × 100 + 1 × 10 + 8 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.

3 D — 70,000 [B1.1] · Ten thousands is the fifth digit from the right.

4 B — 15 [C3.2] · The loop runs 4 times, adding 3 each time: 3 + (4 × 3).

5 B — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 100. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 10 then means editing one number instead of 10 lines.

6 A — 34 [D1.3] · A stem-and-leaf plot is already in order, which is why it is handy for finding a median. Count in from both ends.

7 B — tally table [D1.3] · A tally table records each observation with a stroke, grouped in fives. All three appear in the EQAO glossary, so all three can turn up.

8 A — 72 cm^2 [E2.4] · Area of a trapezoid = (sum of the parallel sides) × height ÷ 2. Or decompose it into a rectangle and two triangles.

9 C — 164 cm^2 [E2.6] · Six faces, in three matching pairs. Find the area of three different faces, add them, then double. Surface area is cm^2, not cm^3.

10 B — 3%, by \$15 [F1.4] · At 3%: \$45. At 4%: \$60. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.

Sheet 39

1 B — 0.8 [B1.6] · 8 hundredths written as a decimal is 0.08. Count the places carefully — a third of students at Level 3 got the equivalent of this wrong.

2 B — 663 [B2.2] · Divisible by 3 when the digit sum is divisible by 3.

3 B and C — 47, 17 [B2.6] · A prime has exactly two factors: 1 and itself. Check 3, 7, 11 and 13 as divisors — 39% of students at Level 3 missed one of the two.

4 C — 16.5 [C2.2] · Multiply before you add. Order of operations.

5 A — 3 [C2.3] · Undo the + 8 first, then undo the × 9.

6 D — 36 [D1.5] · Range = largest − smallest. Median = the middle one once they are in order. Mean = add them all and divide by how many.

7 A — It exaggerates small differences — the bars look many times taller than each other. [D1.6] · Always read the axis before the bars.

8 B — 4 lines of symmetry, rotational order 4 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A square has 4 folds and looks the same 4 times in a full turn. A parallelogram is the catch — no folds, but order 2.

9 D — (-2, 6) [E1.4] · Reflecting in the y-axis flips the sign of the x-coordinate and leaves the other one alone.

10 B — interest earned [F1.2] · Interest earned: money a bank pays you for keeping savings with them.

Sheet 41

1 D — 11x [C2.1] · Like terms add. The x stays an x — it does not become x^2.

2 A — 88 + p = 141 [C2.3] · Solve every single one before choosing. Two of these are within a couple of units of each other, and nearly half of students at Level 2 picked the wrong one of the pair.

3 C — bar graph [D1.3] · Separate, unrelated categories means a bar graph with gaps between the bars. This was the hardest question on the released set — only 37% of students at Level 3, and 56% at Level 4, chose correctly.

4 C — 7x [C2.1] · Like terms add. The x stays an x — it does not become x^2.

5 A — 95.39 [B1.5] · Look only at the digit immediately to the right of the place you are rounding to.

6 A — 27 [D1.5] · Range = largest − smallest. Median = the middle one once they are in order. Mean = add them all and divide by how many.

7 A — composite [B2.6] · 77 is composite — it has a factor other than 1 and itself (7 divides it). Always test 3, 7, 11 and 13.

8 D — line plot [D1.3] · A line plot stacks an X above each value on a number line, so the shape of the data shows. All three appear in the EQAO glossary, so all three can turn up.

9 C — 1/4 [B2.5] · Find a common denominator first — 2 and 4 both go into 4. Never add the denominators.

10 D — 2 [E1.1] · Turn it one full circle and count how many times it looks the same, including at the end. A parallelogram has order 2. Every shape has order at least 1.

11 D — Choosing which data to leave out can reverse the apparent trend. [D1.6] · Always read the axis before the bars.

Sheet 42

12 A — 5.170 [B1.4] · Line the decimals up by place value. Compare tenths, then hundredths, then thousandths.

13 D — 45 cm^2 [E2.4] · A = b × h uses the **perpendicular** height (5 cm), never the slanted side (7 cm). Multiplying by the slant is the commonest area error there is.

14 A — 0.2, 1/2, 3/4, 2 [B1.3] · Turn every one into a decimal first. Negatives are always smaller than positives.

15 D — 44.37 [B2.4] · Line up the decimal points, not the last digits.

16 D — 60 shapes per minute [B2.12] · Two steps. Find the FIRST rate, then double it. Do not double the total first and stop — that was the commonest error on this question.

17 C — 11x [C2.1] · Like terms add. The x stays an x — it does not become x^2.

18 B — 4 [D1.3] · Count the leaves, not the stems. Each leaf is one value.

19 C — 36 cm^2 [E2.4] · Area of a trapezoid = (sum of the parallel sides) × height ÷ 2. Or decompose it into a rectangle and two triangles.

20 D and E — 29, 47 [B2.6] · A prime has exactly two factors: 1 and itself. Check 3, 7, 11 and 13 as divisors — 39% of students at Level 3 missed one of the two.

21 A — tell a story about the data using graphs, numbers and other relevant information together [D1.4] · An infographic combines more than one representation — a table, a graph, a headline figure — to make a point. It still needs proper sources, titles, labels and scales.

22 C — 80/3 [B2.9] · Multiplying by 2/3: divide by 3, then multiply by 2.

Generated, not typed. **Every numeric answer was computed by the same code that printed the question.**

Answers, continued

Sheet 43

23 A — 90 [C3.2] · The loop runs 8 times, adding 10 each time: 10 + (8 × 10).
24 B — a saving goal [F1.2] · Separate the goal itself from the things that help or hinder it.
25 D — trading [F1.5] · Four different ways resources move between people.
26 C — 148 cm^2 [E2.4] · Decompose: whole rectangle 18×10 = 180, minus the notch 4×8 = 32. Only 39% of students at Level 3 handled a composite area correctly.
27 D — 304 [B2.2] · Divisible by 8 when the last three digits are divisible by 8.
28 C — 6 right and 5 up [E1.3] · Subtract the start from the finish. x controls left/right, y controls up/down. Watch the signs in the negative quadrants.
29 C — the same result as a single reflection in the x-axis [E1.4] · Do the transformations one at a time on grid paper. Two identical reflections, or two 180° rotations, always undo each other.
30 C — 25 m [E2.1] · There are 100 cm in 1 m, so divide.
31 C — 312° [E2.2] · Clockwise gives 48°. A full turn is 360°, so counterclockwise is 360 − 48 = 312°. Only 26% of students at Level 2 got this.
32 C — 16 [C3.2] · The loop runs 6 times, adding 2 each time: 4 + (6 × 2).
33 B — $96 [F1.1] · 20% of $120 = $24 — that is the discount, not the price. Subtract it: $120 − $24 = $96. Answering with the discount is the trap.

Sheet 44

34 B — 5 × 100 000 + 3 × 10 000 + 3 × 1000 + 7 × 100 + 6 × 10 + 4 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.
35 D — income [F1.2] · Income: money coming in, from work or other sources.
36 A — 17/100 [D2.2] · Experimental probability comes from what actually happened: 17 out of 100. Theoretical probability comes from the design: 1/6.
37 D — linear growing — it goes up by the same amount each time [C1.1] · Linear means a constant jump. Check the gap between every pair, not just the first.
38 B — 79 + p = 130 [C2.3] · Solve every single one before choosing. Two of these are within a couple of units of each other, and nearly half of students at Level 2 picked the wrong one of the pair.
39 C — linear growing — it goes up by the same amount each time [C1.1] · Linear means a constant jump. Check the gap between every pair, not just the first.
40 A — 14 [B1.2] · Distance on a number line is always positive. Count from a up to 0, then 0 up to b.
41 B — 84 [B2.8] · Dividing by 0.5 makes the answer bigger, not smaller. Multiply both numbers by 10 first: 420 ÷ 5.
42 D — 241 [B2.1] · Two operations, in order. Multiply first, then subtract.
43 D — 1/4 [D2.1] · Reduce by the highest common factor.
44 A — a cone [E1.2] · Take each view one at a time and rule solids out.

Sheet 46

1 C — 35 [B2.1] · Two operations, in order. Multiply first, then subtract.
2 A — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 18. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 6 then means editing one number instead of 6 lines.
3 A — 6 [C2.4] · Solve as if it were an equation, then check whether the boundary value itself works.
4 D — a biased sample [D1.2] · The group chosen already has a stake in the answer. A sample only works if it represents the whole population.
5 C — 270° clockwise [E1.4] · A full turn is 360°. Going 90° one way is the same as going 270° the other way.
6 D — 1/5 [D2.1] · Reduce by the highest common factor.
7 D — 25.2 [C2.2] · Multiply before you add. Order of operations.
8 D — 4 × 10 000 + 2 × 1000 + 9 × 100 + 1 × 10 + 7 × 1 [B1.1] · Expanded form shows each digit multiplied by its place value, added together. A zero digit contributes nothing and is left out.
9 C — 1 line of symmetry, rotational order 1 [E1.1] · Two different symmetries. Lines of symmetry are folds; rotational order is turns. A kite has 1 fold and looks the same 1 time in a full turn. A parallelogram is the catch — no folds, but order 2.
10 A — 80,000 [B1.1] · Ten thousands is the fifth digit from the right.
11 C — $2^3 \times 3^2$ [B2.6] · Build a factor tree and keep splitting until every branch ends on a prime. $72 = 2^3 \times 3^2$. Multiply it back to check.

Generated, not typed. **Every numeric answer was computed by the same code that printed the question.**

Answers, continued

Sheet 47

12 A — Unequal intervals distort the shape of the data. [D1.6] · Always read the axis before the bars.
13 D — 12 [B2.3] · 5% of 240: find 10% first (24), then adjust.
14 C — $24 [F1.4] · 3% of $800. Interest is the cost of borrowing — it is on top of what you repay.
15 B — Program B — it uses a loop, so fewer lines do the same work [C3.2] · Both give 15. Efficiency is about how much code it takes to express the work. A loop is the efficient form, and changing 5 then means editing one number instead of 5 lines.
16 C — 7.446 [B1.4] · Line the decimals up by place value. Compare tenths, then hundredths, then thousandths.
17 A — 78 cm² [E2.4] · Area of a trapezoid = (sum of the parallel sides) × height ÷ 2. Or decompose it into a rectangle and two triangles.
18 C — continuous [D1.1] · Continuous data is measured and can take any value in between — including fractions.
19 B — 1470.3 cm [B2.7] · Multiply as whole numbers, then put back one decimal place.
20 B — an investment [F1.4] · An investment is money put in with the aim of growing over time, with some risk.
21 B — frequency table [D1.3] · A frequency table lists each value or interval beside how many times it occurred. All three appear in the EQAO glossary, so all three can turn up.
22 C — 0.8 [B1.6] · 8 thousandths written as a decimal is 0.008. Count the places carefully — a third of students at Level 3 got the equivalent of this wrong.

Sheet 48

23 B — 83.2 [B1.5] · Look only at the digit immediately to the right of the place you are rounding to.
24 C — 3 [C2.4] · Solve as if it were an equation, then check whether the boundary value itself works.
25 C — 325° [E2.2] · Clockwise gives 35°. A full turn is 360°, so counterclockwise is 360 − 35 = 325°. Only 26% of students at Level 2 got this.
26 C — 48 cm² [E2.4] · For a kite, A = c × d ÷ 2 where c and d are the **diagonals**, not the sides. 12 × 8 ÷ 2 = 48 cm². This formula is printed on your formula sheet.
27 B — $75 [F1.1] · 50% of $150 = $75 — that is the discount, not the price. Subtract it: $150 − $75 = $75. Answering with the discount is the trap.
28 B — 64° [E2.3] · Opposite (vertical) angles are equal.
29 D — −3, −1/2, 1/2, 3/4 [B1.3] · Turn every one into a decimal first. Negatives are always smaller than positives.
30 B — 64/5 [B2.9] · Multiplying by 4/5: divide by 5, then multiply by 4.
31 D — parallelogram [E1.1] · Fold it in half. A square has 4, a rectangle and a rhombus have 2, a kite has 1, a parallelogram has 0. Only 48% of students at Level 3 got the rhombus version right.
32 D — 158 cm² [E2.6] · Six faces, in three matching pairs. Find the area of three different faces, add them, then double. Surface area is cm², not cm³.
33 A — 11 [C1.3] · The term value goes up 5 each time the term number goes up 2, so the rule is value = 5 × term + 5. Solve for the TERM NUMBER — the commonest error is giving another term value instead.

Sheet 49

34 D — 60.3 [C2.2] · Multiply before you add. Order of operations.
35 A — 1/6 [D2.2] · Theoretical probability is worked out from the design, not from any trial: 1 red section out of 6 = 1/6.
36 B — 52.4 [C2.2] · Multiply before you add. Order of operations.
37 D — 11/10 [B2.5] · Find a common denominator first — 2 and 5 both go into 10. Never add the denominators.
38 C — 1/36 [D2.2] · For two independent events, multiply the probabilities.
39 B — 27 [D1.5] · Range = largest − smallest. Median = the middle one once they are in order. Mean = add them all and divide by how many.
40 B — 5 left and 5 down [E1.3] · Subtract the start from the finish. x controls left/right, y controls up/down. Watch the signs in the negative quadrants.
41 B — 15 [C1.3] · The term value goes up 3 each time the term number goes up 2, so the rule is value = 3 × term + 5. Solve for the TERM NUMBER — the commonest error is giving another term value instead.
42 A — 32.461 kg [B2.11] · Divide as usual and keep the decimal point directly above where it started.
43 B — 3%, by $120 [F1.4] · At 3%: $120. At 6%: $240. The lower rate always costs less when you are **borrowing** — but you want the higher rate when you are **saving**.
44 C and D — 43, 29 [B2.6] · A prime has exactly two factors: 1 and itself. Check 3, 7, 11 and 13 as divisors — 39% of students at Level 3 missed one of the two.

Generated, not typed. Every numeric answer was computed by the same code that printed the question.