Grade 4 Math
Between the Whole Numbers

35 sheets · every strand · the year the number line fills in

THIS BOOK BELONGS TO

.....

Find your strand

Brand new this year

Fractions
halves to tenths, properly

Remainders as fractions
nobody bins the last cookie

Angles named
acute, right, obtuse, straight

Decimals
tenths — the first ones ever

The Cartesian plane
along, then up

The mean
sharing a total out equally

All the tables
1×1 to 10×10, by heart

The area formula
length × width

Money as decimals
$4.50 is a number, not a label

Grown-ups: Grade 4 is the biggest structural jump in elementary school — a new division, a new subject, and three enormous mathematical ideas arriving at once. If it feels like a lot, that's because it is. The times tables (`B2.2`) are the one thing worth protecting time for; almost everything in Grade 5 is built on top of them.

Ontario 2020 · 48 expectations

Up to ten thousand

Say each one out loud before you write. Canada writes 4 500 with a space, never a comma.

write say it

Thousands	Hundreds	Tens	Ones	The number
4	7	0	6	
9	0	5	2	
				6 840
				3 007

What is the 7 worth?

in 4 706 .....

in 7 015 .....

in 3 270 .....

Break it apart three ways. 5 240 =

The zero has a job. In 3 007 there are two zeros doing different work. Say what each one is holding open.

Grown-ups: "composing and decomposing" means splitting a number up in more than one way — 5 240 is 5000+200+40, and also 52 hundreds and 4 tens. Both are correct. B1.1

Which is bigger, and rounding

Compare the biggest place first. To round, find the two nearest and see which one you're closer to.

compare round

4 706 ☐ 4 760

985 ☐ 1 020

6 004 ☐ 6 040

8 888 ☐ 8 889

Rounding 3 800 to the nearest thousand

Past halfway, so it rounds up to **4000**.

Number	Nearest ten	Nearest hundred	Nearest thousand
2 748			
6 195			
4 502			
9 950			

Why round at all? Round 4 502 three times. Do you get closer to the real number each time, or further away? So when is rounding useful?

Grown-ups: the last question matters more than the table. Rounding is a choice about usefulness, not a rule about digits.

B1.2 · B1.3

Cutting a whole into equal parts

The bottom number says how many equal pieces the whole was cut into. The top says how many you have. That's the whole idea.

shade name it

One whole · halves · thirds · fourths · fifths · sixths · eighths · tenths. Colour each row differently and keep this page.

Use your wall. Write <, > or =.

1/2 ..... **1/4** **1/3** **1/5**

2/4 ..... **1/2** **3/8** **1/2**

The surprising one. Is 1/8 bigger or smaller than 1/3? Why does the *bigger* bottom number make a *smaller* piece?

Grown-ups: "the bigger the bottom, the smaller the piece" is the single most useful sentence in Grade 4 fractions — and it only lands with folded paper, not explanation.

B1.4 · B1.5

Fractions keep counting past one

Say these out loud. All of them. Out loud is the whole exercise — it takes ninety seconds and fixes two things at once.

say aloud | carry on

one fourth · two fourths · three fourths · four fourths · five fourths · six fourths · seven fourths

Four fourths is exactly 1. Eight fourths is exactly 2. Keep going anyway.

Carry each one on			
1/2, 2/2, 3/2			
1/3, 2/3, 3/3, 4/3			
1/5, 2/5, 3/5			
1/10, 2/10, 3/10			

Circle every one that equals exactly 1.

5/5 8/4 10/10 6/8 3/3

Circle every one **bigger** than 1.

7/8 9/8 4/5 11/10 5/6

Do it in the car. Counting in thirds or fifths out loud is the cheapest maths practice there is, and it's the groundwork for everything Grade 5 does with fractions.

Grown-ups: this kills two misconceptions at once — that fractions are always less than one, and that a fraction is two separate numbers. B1.6

0.7 or 0.15?

This one catches almost everybody. More digits does **not** mean bigger. Use the line every time until you stop needing it.

use the line | write < or >

0.7 ☐ **0.15**

0.5 ☐ **0.9**

0.4 ☐ **0.6**

1.2 ☐ **0.8**

Round each to the nearest whole number.

0.4	0.8	1.5	2.3

Say why, in words. Somebody says 0.15 must be bigger than 0.7 because 15 is bigger than 7. Write what you'd tell them.

Grown-ups: a metre stick beats any explanation here. 0.7 m and 0.15 m are visibly different lengths. Don't try to fix this with numbers alone.

B1.7 · B1.8

The same amount, two ways

Seven tenths can be written 7/10 or 0.7. They are one amount with two spellings.

shade · both ways

fraction: _____ decimal: _____

fraction: _____ decimal: _____

fraction: _____ decimal: _____ and also: _____

That last one has a third name. Half.

Fraction	Decimal	Fraction	Decimal
4/10			0.9
10/10			1.2

10/10 is exactly 1. So what is 12/10? Write it as a decimal and as a mixed amount.

Grown-ups: `B1.9` is the bridge that Grade 5 builds percents on top of. Money is where children already accept it — $0.50 is half a dollar. B1.9

All of them, by heart

Fill every square. Then colour green anything you knew instantly and orange anything you had to work out. Be honest — the orange ones are the useful information.

fill in colour

knew it straight away had to work it out

×	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Look at the diagonal from the top left — 1, 4, 9, 16, 25… those are the square numbers. And notice the two halves either side of it are the same.

Grown-ups: `B2.2` is the highest-stakes expectation of Grade 4. Almost everything in Grade 5 assumes it is free. The colouring is the diagnostic — it tells you exactly which facts to practise.

B2.2

Only ten are actually hard

Go back to your grid and cross these off. Each rule removes a whole load of squares at once.

spot | count

Rule	Why it's free	Squares gone
The 1s	anything times 1 is itself	
The 10s	every digit moves one place left	
The 2s	it's just doubling	
The 5s	they all end in 5 or 0, and you count in fives already	
Swapping	7 × 8 and 8 × 7 are one fact, so learn it once	
The 9s	the two digits of the answer always add up to 9	

squares in the grid

100

left after crossing out

Check the 9s trick. 9 × 4 = 36, and 3 + 6 = 9. 9 × 7 = 63, and 6 + 3 = 9. Does it work for all of them up to 9 × 10?

My hard ones. Whatever is still orange is *your* list. Write it here — that short list is the whole job.

Grown-ups: five minutes a day on the orange list only, never timed. Making the job look small is most of what makes it doable.

B2.1 · B2.2

Every fact has a divide twin

If you know 7 × 8 = 56, you already know two division facts. Write all four members of each family.

write check

One family, four facts

7 × 8 = 56 · 8 × 7 = 56 · 56 ÷ 7 = 8 · 56 ÷ 8 = 7

Start with	×	÷	÷
6 × 9			
4 × 7			
8 × 8			

Fill the gap.

? × 8 = 48

63 ÷ 9 = ?

7 × ? = 42

Why this matters. A missing factor is a division question wearing a disguise. Spotting that makes algebra much less frightening later.

Grown-ups: the related division facts are half of `B2.2` and the half most often skipped.

Split it up, then add it back

You already know 200 × 3. You already know 40 × 3. Put them together and you've done 243 × 3 without learning anything new.

split add

☑ **243 × 3**

200 × 3	40 × 3	3 × 3
600	120	9

600 + 120 + 9 = 729

Question	Split into	Answer
132 × 4		
58 × 6		
417 × 2		
64 × 7		

Then check it. Do 132 × 4 again in columns. You should get the same answer. If not, one of the two is wrong — find out which.

Grown-ups: both methods are expected. The split version is what makes the column version make sense, which is why it comes first.

B2.5 · B2.1

Nobody bins the last cookie

When a share doesn't come out evenly, the leftover doesn't vanish and it isn't "remainder 1". You cut it up and share that too.

draw · write the fraction

17 cookies, 4 people

Each gets 4 whole cookies. That uses 16. One is left — cut it into 4 and everyone gets a quarter more.

17 ÷ 4 = 4 and 1/4 each

Share this	Draw it	Each one gets
13 ÷ 2		
11 ÷ 3		
22 ÷ 5		
19 ÷ 4		

When would you NOT cut the leftover up? Think about buses, or boxes, or shoes. Write one example where the leftover has to stay whole.

Grown-ups: the last question is the sophisticated one. Whether a remainder becomes a fraction depends entirely on what's being shared.

B2.6 · B1.5

Adding and taking away, up to 10 000

In your head where you can, in columns where you can't. Estimate first, every time.

8 estimate | calculate

In your head — up to 1000

340 + 250 = ...

600 − 175 = ...

480 + 320 = ...

905 − 400 = ...

In columns — up to 10 000

Question	Roughly	Exactly
4 682 + 2 735		
8 000 − 3 460		
5 407 + 1 896		

Decimal tenths

0.4 + 0.3 = ...

1.2 − 0.5 = ...

0.8 + 0.7 = ...

2.0 − 0.6 = ...

Was your estimate close? If the exact answer is far from your estimate, one of them is wrong. Estimating isn't extra work — it's the check.

Grown-ups: 0.8 + 0.7 crossing 1 is the one worth watching. Ten tenths make a whole, exactly like ten ones make a ten.

B2.3 · B2.4 · B2.7

Problems that need more than one go

Read it twice. Write down what you're finding **first**, before you find the answer.

plan check

1. A school buys 8 boxes of pencils. Each box holds 24. They give 60 to the art room. How many are left?

First I need to find: .....

2. Three friends share 25 stickers equally. How many each, and how many left over?

3. A book costs $7.50. How much for 4 of them? You pay with $40 — what's the change?

4. Check number 1 a different way from how you solved it. Same answer?

Grown-ups: checking a different way is written into `B2.1` — it isn't a nicety.

B2.1 · B2.8

Money is a decimal in disguise

$4.50 isn't a label. It's four wholes and five tenths of a dollar.

8 add | change

Buying	Total	You pay with	Change
$3.40 + $2.15		$10	
$6.75 + $1.80		$10	
$4.99 × 3		$20	

Which is more?

$0.70 ..... $0.15

$1.05 ..... $1.50

Notice. $0.70 versus $0.15 is the same question as 0.7 versus 0.15 on sheet 5 — but here you already knew the answer. Why is money easier?

Grown-ups: money is the one context where children already believe decimals. Use it as the bridge to everything else.

B1.7 · B2.7 · F1.2

Number — how am I doing?

Tick honestly. Nothing here is marked. A blank is information, not a failure.

tick

- ☐ I can read and write numbers to 10 000
- ☐ I know the bigger the bottom, the smaller the piece
- ☐ I know 0.7 is bigger than 0.15
- ☐ I know my times tables to 10 × 10
- ☐ I can split a multiplication up and add it back
- ☐ I can add and subtract to 10 000
- ☐ I can round to ten, hundred and thousand
- ☐ I can count past one in fractions
- ☐ I can write 7/10 as 0.7
- ☐ I know the divide twin of every fact
- ☐ I can share a leftover as a fraction
- ☐ I can add decimal tenths

The one I want to get better at is…

_____

…and the sheet that would help is number .....

Grown-ups: a blank on the times-tables row is the one to act on. It's the load-bearing row for the whole of Grade 5.

B1.1–B2.8

Patterns that grow

Find the rule, then jump ahead without drawing every step.

find the rule · predict

Pattern	The rule	Next three
3, 7, 11, 15		
2, 4, 8, 16		
100, 90, 80, 70		
0.5, 1.0, 1.5, 2.0		

Term	Value
1	5
2	8
3	
4	
10	

The rule is: start at _____ and _____ each time.

Without listing them all — what's the value at term 10? Say how you worked it out.

Jumping ahead is the point. Anyone can list ten steps. Working out term 10 without listing them is the beginning of a formula.

Grown-ups: Grade 4 patterns can grow by adding *or* multiplying. Spotting which is the skill. C1.1 · C1.2 · C1.3

Keeping both sides the same

The equals sign doesn't mean "the answer comes next". It means "the same as". That matters more than it sounds.

8 solve ☑ check

☑ **Worked example**

n + 17 = 32 → n = 15

Check: 15 + 17 = 32. Both sides match, so it's right.

Equation	The letter is	Check — write it out
n + 24 = 41		
x − 9 = 26		
4 × b = 36		
m + 13 = 50		

More than one answer — shade every whole number that works.

n + 5 < 12

n + 2 > 9

Is this true? Somebody writes 6 × 4 = 12 × 2. Is it? Work out both sides and see.

Grown-ups: if "=" still reads as "the answer comes next", algebra will feel arbitrary for years. It's worth five minutes to check.

C2.1 · C2.2 · C2.3

A loop inside a loop

Grade 4 code puts one repeat inside another. Trace it carefully — the inside one finishes first.

trace predict

Trace this

```
repeat 4 times:
  repeat 3 times:
    clap
  stamp
```

The inside loop runs all the way through before a single stamp happens.

how many claps

how many stamps

Code	Claps	Stamps
repeat 5 [repeat 2 [clap] stamp]		
repeat 3 [repeat 4 [clap] stamp]		

Write your own. Make a nested loop that produces exactly 12 claps and 4 stamps.

No computer needed. Do it with hands and feet, out loud, slowly. Then predict the next one before you run it.

Grown-ups: nested loops are multiplication in disguise — 4 lots of 3 claps. Saying that out loud connects two strands.

C3.1 · C3.2

Work out something real

Pick one. There's no single right answer — you're judged on whether the reasoning holds together.

decide justify

Choose one:
- How many pencils would the whole class need for a year?
- If you saved the same amount each week, how long until you could afford something you want?
- How much water does your family drink in a week?

1. What exactly am I working out?

2. What do I need to know or guess?

3. My working

4. My answer — and is it sensible?

5. What would change the answer a lot?

Grown-ups: `C4` has no specific expectations — it's assessed through the others. Question 5 is what separates Level 3 from Level 4. C4 · C1.4

Collect it, then tidy it up

Ask a real question, tally the answers, then turn the mess into something readable.

8 tally | graph it

My question: .....

Who I asked: ..... How many: .....

Answer	Tally	How many

Now draw it. Title, both axes labelled, and a sensible scale.

Did you collect it yourself? Then it's **primary** data. If you looked it up, it's **secondary**. Which is yours?

Grown-ups: the primary/secondary distinction lands best on data the child gathered personally.

D1.1 · D1.2 · D1.3

Stem and leaf

A clever way to show every number and its shape at once. The stem is the tens, the leaf is the ones.

build it | read it

These scores: 23, 25, 31, 34, 34, 42

2 | 3 5

3 | 1 4 4

4 | 2

2 | 3 means 23. Every number is still there, and you can see the shape.

Your turn: 15, 22, 27, 27, 31, 33, 38, 41

the biggest

the smallest

the mode

What can a stem-and-leaf do that a bar graph can't? Look at your two pages and say what each one shows better.

Grown-ups: stem-and-leaf keeps every original value, which bar graphs throw away. That's the answer to the last question.

D1.3 · D1.4

Sharing the total out equally

The **mean** is new this year. Add everything up, then share the total equally between however many there were.

work it out | explain

Four children read 3, 5, 4 and 8 books

Altogether that's 20 books. Shared between 4 people, that's **5 each**. The mean is 5 — even though nobody actually read exactly 5.

The numbers	Total	How many	Mean
6, 8, 10			
2, 5, 5, 8			
4, 4, 7, 9			

Also find the mode — the one that turns up most often.

In 2, 5, 5, 8 the mode is .....

In 4, 4, 7, 9 the mode is .....

The tricky bit. Can the mean be a number that isn't in the list at all? Give an example.

_____

Grown-ups: the mean not appearing in the data is the conceptual hurdle. Sharing counters out physically is the fix. D1.5 · D1.6

How likely is it?

Five words, in order. Where does each event sit on the line?

place it predict

Event	Which word?
A fair coin lands heads	
A die shows a number under 7	
A die shows a 7	
Picking red from a bag of 9 red and 1 blue	
Picking blue from that same bag	

Test one. Flip a coin 20 times and tally. Did you get exactly 10 heads?

Heads _____ Tails _____

Does an even chance mean exactly half the time? Write what you think.

Grown-ups: the coin experiment usually doesn't come out even, and that *is* the lesson. Grade 5 turns these words into fractions. D2.1 · D2.2

The same data, two ways

Draw the same numbers as a bar graph and as a stem-and-leaf. Then say which is better for which job.

draw both | compare

The numbers: **12, 15, 15, 21, 24, 26, 26, 26, 33, 37**

As a bar graph (group them in tens)

As a stem-and-leaf

the mean

the mode

how many altogether

Which would you use to show a friend the general shape? Which to find one exact number? Say why.

Grown-ups: `D1.4` asks the child to *justify* the choice of graph, not just draw one. The last box is the expectation.

D1.4 · D1.5

Naming angles

Four names this year. Use the corner of a piece of paper as your right angle and compare.

compare | name

The four names

Acute — smaller than a square corner · **Right** — exactly a square corner · **Obtuse** — bigger than a square corner but not a straight line · **Straight** — a flat line

Draw one of each, then label them.

acute	right	obtuse	straight

Go and find them. Name five angles in the room around you and say which kind each one is.

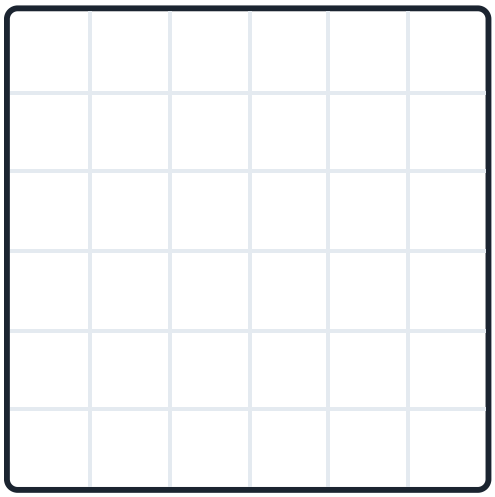
Not yet. Measuring angles in degrees with a protractor is Grade 5. This year you compare them, which is the groundwork.

Grown-ups: a paper corner is all that's needed. Introducing a protractor now usually confuses rather than helps.

Along the corridor, then up the stairs

Coordinates are always (along, up). (3, 5) and (5, 3) are two different places, and mixing them up is the classic mistake.

plot read



Label both axes 0 to 6.

Plot and join in order:

(1, 1) → (5, 1) → (5, 4) → (1, 4) → back

What shape did you make? .....

How do you get from (1, 1) to (5, 4)?

..... right and ..... up

Mark P at (2, 6) and Q at (6, 2). Same place?

Play battleship. It's a coordinate grid with something at stake, and one game does more than a page of practice.

Grown-ups: this is the beginning of every graph your child will ever read. The order isn't a convention to memorise — it's the whole meaning.

E1.2 · E1.3

Slide it and flip it

A translation slides. A reflection flips. Neither changes the size or the shape.

transform draw

Transformation	What changes	What stays the same
Translation (slide)		
Reflection (flip)		

Translate this shape 3 right and 2 up.

Reflect it in the dotted line.

Symmetry. Draw a shape with exactly two lines of symmetry. Then one with none at all.

Not yet. Rotations — turning a shape around a point — are Grade 5. This year it's slides and flips.

Grown-ups: tracing paper is the honest tool for both. Cut the shape out and physically move it.

E1.1 · E1.3

Rows and columns, and a formula

Count the squares once. Then notice you didn't need to count — you already knew 6 rows of 4 from your times tables.

8 count | work back

Forwards. Find the area.

rows: _____ each row: _____ area: _____

Backwards. The area is 24 cm² and one side is 6 cm.

24 cm²

The other side is _____ cm. Which operation did you use?

Length	Width	Area	Perimeter
7 cm	5 cm		
9 cm		36 cm²	
8 cm	8 cm		

Why cm²? Area is measured in squares, not lengths. That's what the little 2 is telling you.

Grown-ups: working backwards from the area is a division problem wearing a geometry costume — and easy for a child who has their tables. E2.5 · E2.6

Same area, different fence

Area is the grass inside. Perimeter is the fence around. Twelve tiles make three different fences.

arrange | measure both

Rectangle	Area	Perimeter
1 × 12		
2 × 6		
3 × 4		

Smallest perimeter? .....

Largest? .....

What do you notice about the shape with the smallest one?

The other way round. Draw two shapes with the *same perimeter* but different areas.

Say it in one sentence. Two shapes with the same area can have…

Grown-ups: this confusion is stubborn — Grade 3 and Grade 5 both revisit it. Physical tiles settle it faster than anything drawn. E2.5 · E2.6

Count up, never subtract clocks

Time is the only base-60 thing you meet. Taking 2:45 from 4:20 in columns gives nonsense. Jump to the next o'clock instead.

jump total

From 2:45 to 4:20

2:45 → 3:00 15 min → 4:00 1 hour → 4:20 20 min

1 hour 35 minutes altogether

Starts	Ends	Your jumps	How long
1:50	3:15		
9:35	11:10		
4:20	6:05		

minutes in 3 hours

seconds in 4 minutes

hours in 3 days

Grown-ups: keep a real clock face on the table while doing this. It's worth more than any number of worksheets.

Measuring with the right unit

Estimate first, then measure. Being roughly right before you start is a real skill.

measure | convert

Thing	Best unit	My estimate	Measured
The length of this book			
The width of the room			
The mass of an apple			
Water in a drinking glass			

Useful to know

1 m = 100 cm · 1 cm = 10 mm · 1 kg = 1000 g · 1 L = 1000 mL

3 m = _____ cm

250 cm = _____ m

2 kg = _____ g

1500 mL = _____ L

Which unit would be silly? Measuring the room in millimetres, or an apple in kilograms. Say why each one is a bad choice.

Grown-ups: choosing a sensible unit is `E2.1`, and it's more useful in daily life than the conversions themselves.

E2.1 · E2.2

Spatial Sense — how am I doing?

Tick honestly. A blank is information.

tick

- ☐ I can name acute, right, obtuse and straight angles
- ☐ I know (3, 5) isn't the same as (5, 3)
- ☐ I can find lines of symmetry
- ☐ I can work backwards from an area
- ☐ I can find elapsed time by counting up
- ☐ I can plot a point as (along, up)
- ☐ I can translate and reflect a shape
- ☐ I can work out area with length × width
- ☐ I know same area doesn't mean same perimeter
- ☐ I can choose a sensible unit to measure with

The one I want to get better at is…

_____

…and the sheet that would help is number .....

Grown-ups: the coordinates row is worth checking. It's the foundation for every graph from here on.

E1.1–E2.6

Ways to pay

Cash, debit, credit, gift card, e-transfer. They're not the same thing, and the difference matters.

sort explain

Way to pay	Where does the money come from?	When does it leave?
Cash		
Debit card		
Credit card		
Gift card		

The important difference. A debit card uses money you already have. A credit card borrows it. Why does that matter?

Notice. With cash you can see the money go. With a card you can't. Does that change how carefully people spend?

Grown-ups: the debit/credit distinction is the whole of `F1.1` at this age. Grade 5 adds what borrowing actually costs.

Is it a good buy?

Cheaper isn't always better value, and value isn't only about price.

compare · choose

Option A	Option B	Which is better value?
4 for $2.00	10 for $4.50	
1 L for $2.40	500 mL for $1.30	
a pack of 6 for $3	single ones at 60¢	

Work out the cost of one. That's the fair comparison.

4 for $2.00 = _____ each

10 for $4.50 = _____ each

When would you buy the worse value one anyway? Give two real reasons.

_____

_____

Go and look. Supermarket shelf labels print the price per 100 g in tiny type. Find one — most adults have never noticed it.

Grown-ups: the "when would you buy the worse one anyway" question is the Level 4 half — value isn't only price.

F1.2 · F1.3

Spending, saving, giving

A budget is a plan for money you haven't spent yet. Make it add up exactly.

plan decide

You get **$20** a month. Plan it.

What for	How much	Why
Spending		
Saving		
Giving		
Total	**$20.00**	

Something costs $75. At your saving rate, how many months?

Ways people earn money. Name three, and say what each one asks of you.

Change one thing. If you doubled your saving, how much sooner would you get the $75 thing? Work it out — the answer is more satisfying than you'd think.

Grown-ups: a real budget with real pocket money beats a hypothetical one every time.

F1.4 · F1.5

Answers — Number

> Only the questions with one right answer are here. Anything asking you to explain or decide is judged on the reasoning.

1. 4706 · 9052 · 6/8/4/0 · 3/0/0/7. The 7 is worth 700, 7000, 70. 5240 = 5000+200+40, and also 52 hundreds + 4 tens. In 3007 the first zero holds the hundreds place, the second holds the tens.

2. < · < · < · <. Rounding: 2748 → 2750, 2700, 3000 · 6195 → 6200, 6200, 6000 · 4502 → 4500, 4500, 5000 · 9950 → 9950, 10 000, 10 000.

3. 1/2 > 1/4 · 1/3 > 1/5 · 2/4 = 1/2 · 3/8 < 1/2. 1/8 is **smaller** than 1/3 — a bigger bottom number means the whole was cut into more pieces, so each one is smaller.

4. Carrying on: 4/2, 5/2, 6/2 · 5/3, 6/3, 7/3 · 4/5, 5/5, 6/5 · 4/10, 5/10, 6/10. Equal to 1: 5/5, 10/10, 3/3. Bigger than 1: 9/8, 11/10.

5. 0.7 > 0.15 · 0.5 < 0.9 · 0.4 < 0.6 · 1.2 > 0.8. Rounding: 0.4 → 0, 0.8 → 1, 1.5 → 2, 2.3 → 2.

6. 3/10 = 0.3 · 7/10 = 0.7 · 5/10 = 0.5 = one half. Then 4/10 = 0.4 · 9/10 = 0.9 · 10/10 = 1.0 · 12/10 = 1.2. And 12/10 is 1 and 2/10.

8. The 1s remove 19 squares, the 10s another 17, the 2s another 15, the 5s another 11. Swapping halves what's left. Counting generously, **about ten facts** are genuinely new — and the 9s trick removes several of those too. Yes, the digit trick works for every 9 fact up to 9 × 10.

9. 6×9 = 54, 54÷6 = 9, 54÷9 = 6 · 4×7 = 28 · 8×8 = 64 (this family has only three members, because 8 and 8 are the same). Gaps: 6 · 7 · 6.

10. 132×4 = 400+120+8 = **528** · 58×6 = 300+48 = **348** · 417×2 = 800+20+14 = **834** · 64×7 = 420+28 = **448**.

11. 13÷2 = 6 and 1/2 · 11÷3 = 3 and 2/3 · 22÷5 = 4 and 2/5 · 19÷4 = 4 and 3/4. You wouldn't cut the leftover up for buses, boxes or shoes — you'd round up or leave it whole.

12. 590 · 425 · 800 · 505. Then 7417 · 4540 · 7303. Decimals: 0.7 · 0.7 · 1.5 · 1.4.

13. 1. 8×24 = 192, minus 60 = **132**. **2.** 8 each with 1 left over. **3.** 4 × $7.50 = $30, change **$10**.

14. $5.55, change $4.45 · $8.55, change $1.45 · $14.97, change $5.03. And $0.70 > $0.15 · $1.05 < $1.50.

Grown-ups: sheet 8's count is deliberately approximate — the exact number depends how you count overlaps. The point is that it's around ten, not a hundred. B1.1–B2.8

Answers — Algebra, Data

16. Add 4 → 19, 23, 27 · Double → 32, 64, 128 · Take away 10 → 60, 50, 40 · Add 0.5 → 2.5, 3.0, 3.5. The table: 11, 14, and term 10 gives **32**. The rule is start at 5 and add 3 each time, so term 10 is 5 + 3×9 = 32.

17. n = 17 · x = 35 · b = 9 · m = 37. Inequalities: n + 5 < 12 means n < 7, so 0 to 6 work. n + 2 > 9 means n > 7, so 8 upwards. And yes, 6 × 4 = 12 × 2 — both sides are 24.

18. The worked example gives **12 claps and 4 stamps**. Then repeat 5 [repeat 2 [clap] stamp] gives 10 claps and 5 stamps. Repeat 3 [repeat 4 [clap] stamp] gives 12 claps and 3 stamps. For exactly 12 claps and 4 stamps: repeat 4 [repeat 3 [clap] stamp].

21. The stem-and-leaf: 1 | 5 · 2 | 2 7 7 · 3 | 1 3 8 · 4 | 1. Biggest 41, smallest 15, mode 27.

22. 6, 8, 10 → total 24, mean **8** · 2, 5, 5, 8 → total 20, mean **5**, mode 5 · 4, 4, 7, 9 → total 24, mean **6**, mode 4. Yes, the mean can be a number not in the list — 6 doesn't appear in the last one at all.

23. Coin: even chance · under 7: certain · a 7: impossible · red from 9 red and 1 blue: likely · blue from that bag: unlikely. An even chance does **not** mean exactly ten heads in twenty flips.

24. The numbers total 235 across 10 values, so the mean is **23.5**. The mode is **26**. Ten numbers altogether. Stem-and-leaf shows every exact value; the bar graph shows the general shape more quickly.

Grown-ups: in sheet 22, a mean that doesn't appear in the data is the conceptual hurdle. It's worth pausing on. C1.1–D2.2

Answers — Spatial Sense, Money

26. The four points make a **rectangle**. From (1, 1) to (5, 4) is **4 right and 3 up**. P at (2, 6) and Q at (6, 2) are completely different places — that's the whole reason the order matters.

27. Translation: only the position changes; size, shape and which way it faces all stay. Reflection: it faces the other way; size and shape stay.

28. The array is 6 across and 4 down, so the area is **24**. Working backwards from 24 cm² with one side 6 cm gives **4 cm** — that's division. Table: 7×5 → area 35, perimeter 24 · 9 × 4 = 36, perimeter 26 · 8×8 → area 64, perimeter 32.

29. All three have area 12. Perimeters: 1×12 → 26 · 2×6 → 16 · 3×4 → 14. The smallest perimeter belongs to the squarest shape.

30. 1:50 to 3:15 is **1 h 25 min** · 9:35 to 11:10 is **1 h 35 min** · 4:20 to 6:05 is **1 h 45 min**. Then 180 minutes · 240 seconds · 72 hours.

31. 3 m = 300 cm · 250 cm = 2.5 m · 2 kg = 2000 g · 1500 mL = 1.5 L.

33. Cash — money you have, gone immediately. Debit — money in your account, gone immediately. Credit — borrowed from the bank, paid back later. Gift card — money already paid, held for one shop.

34. 4 for $2.00 is 50¢ each; 10 for $4.50 is 45¢ each, so B. 1 L for $2.40 is $2.40 per litre; 500 mL for $1.30 is $2.60 per litre, so A. The pack of 6 at $3 is 50¢ each, so it beats singles at 60¢.

35. The three amounts must total exactly $20. Whatever you chose for saving, $75 divided by that amount is your answer — and doubling the saving halves the wait.

The sheets with no answers here are not mistakes. Anything asking you to explain, design, choose or reflect is judged on whether the reasoning holds together — not on matching a particular sentence.

Grown-ups: in Ontario's four achievement categories, **Thinking** and **Application**, which is where Level 4 lives. Accuracy alone is Level 3. Growing Success, 2010