Proportion: fact sheet

Planner week 11 · Learn these facts

Recipes

10 scones: 40 g sugar

25 scones: × 2.5

= 100 g

Find the scale factor

new amount ÷ old amount

Unitary method

5 folders cost £5.60

1 folder: £1.12

20 folders: £22.40

Find **one** first

Then multiply

Greatest number

500 g ÷ 175 g × 16 = 45.7

625 g ÷ 250 g × 16 = 40

Answer: 40

Do every ingredient

The smallest answer wins

Enough?

need 35 × 4 = 140

have 3 × 48 = 144

Yes, 4 spare

Compare need with have

Write yes or no and why

Inverse proportion

5 taps: 120 min

1 tap: 600 min

3 taps: 200 min

More workers, **less** time

Multiply, then divide

Rates

6 parts every 10 min

36 parts per hour

12 hours: 432

Change to per hour first

Then multiply

Assumptions

"every tap fills at the same rate"

Everything works at the same rate

Or the recipe is followed exactly

Which way?

Direct	more biscuits, more flour
Inverse	more pumps, less time

Which sheet do I need?

Recipes and direct proportion ▸
more of one means more of the other

Inverse proportion ▸
more workers, less time

Key words

- **Direct proportion** both go up together
- **Inverse proportion** one goes up, the other goes down
- **Scale factor** what you multiply by
- **Unitary method** find one first

Exam tips

- Write down what you know: 10 scones → 40 g.
- Find the scale factor or find one.
- "Greatest number": check **every** ingredient.
- Inverse: multiply to find the total work, then divide.
- Round down when you can only make whole things.
- Answer the question: yes or no, with numbers.

Recipes and direct proportion: fact sheet

Proportion · Planner week 11 · Work out which type it is, follow the example

1 DIRECT: scale factor

16 flapjacks need 120 g butter, 140 g sugar and 250 g oats. Jenny makes 24 flapjacks. How much of each does she need?

	flapjacks	butter
recipe	16	120 g
× 1.5	24	**180 g**

1. More flapjacks → **more** of each: direct
2. **Scale factor**: 24 ÷ 16 = 1.5
3. **Multiply** every amount by 1.5
4. **180 g, 210 g, 375 g**

Use this when: more of one means more of the other: recipes, costs, petrol

2 DIRECT: find one first

6 tins of beans cost £3.60. Work out the cost of 15 tins.

tins	cost
6	£3.60
1	£0.60
15	**£9.00**

1. More tins → **more** money: direct
2. **Find one**: £3.60 ÷ 6 = £0.60
3. **Multiply**: £0.60 × 15 = **£9.00**

Use this when: the scale factor is not a nice number: find the cost of one first

3 Greatest number you can make

A recipe for 12 cakes needs 300 g flour and 150 g butter. Sam has 1000 g flour and 400 g butter. What is the greatest number of cakes he can make?

	for 12	Sam has	cakes
flour	300 g	1000 g	40
butter	150 g	400 g	**32**

1. Work out how many cakes **each** ingredient makes
2. Flour: 1000 ÷ 300 × 12 = 40 · Butter: 400 ÷ 150 × 12 = 32
3. Take the **smallest**: **32 cakes** (the butter runs out first)

Use this when: "greatest number" or "does she have enough?"

The big question

If one amount goes **up**, does the other go **up too** (direct), or does it go **down** (inverse)?

Say it in a sentence: *more people → more food* (direct), *more pumps → less time* (inverse).

Careful: the numbers can look the same in both.

Watch out

- Adding instead of multiplying (16 → 24 is not + 8 g).
- Taking the biggest answer for "greatest number".
- Forgetting one of the ingredients.

Inverse proportion: fact sheet

Proportion · Planner week 11 · Work out which type it is, follow the example

1 INVERSE: one goes up, one goes down

It takes 14 hours for 5 identical pumps to fill a tank. How long would it take 4 pumps?

pumps	hours
5	14
4	17.5

1. Fewer pumps → **more** time: inverse
2. **Total work**: 5 × 14 = 70 pump-hours
3. **Divide** by the new number: 70 ÷ 4
4. = **17.5 hours** (longer ✓)

Use this when: more of one means less of the other: workers, pumps, taps, speed and time, sharing

2 WHICH WAY? Say it in a sentence

Direct or inverse?

sentence	type
more biscuits → more flour	DIRECT
more workers → less time	INVERSE
more hours worked → more pay	DIRECT
more people sharing → less each	INVERSE
faster speed → less time	INVERSE

1. Say it: **more** of one means **more** or **less** of the other?
2. More → more: **direct** (multiply by the scale factor)
3. More → less: **inverse** (multiply, then divide)
4. Check: should your answer be bigger or smaller?

Use this when: check your answer: should it be bigger or smaller?

The big question

If one amount goes **up**, does the other go **up too** (direct), or does it go **down** (inverse)?

Say it in a sentence: *more people → more food* (direct), *more pumps → less time* (inverse).

Careful: the numbers can look the same in both.

Watch out

- Using direct proportion (14 × 4 ÷ 5).
- Answer gets smaller when it should get bigger.
- Forgetting the assumption: all work at the same rate.