# Proportion problems

## Notes and guidance

In this small step, children explore different strategies for solving proportion problems.

Building on previous steps, a double number line is a useful representation for these types of problems. Begin by looking at simple one-step problems that involve a single multiplication or division, for example "4 _____ cost _____ . What do 12 cost?" or "4 _____ cost _____ . What do 2 cost?"

Then move on to two-step problems, where children first need to find the value of 1 _____ through division. Again, seeing this on a double number line helps to show children that both values need to be divided by the same amount to find 1, then both new values can be multiplied by the same amount to find any new value.

### Things to look out for

- In one-step proportion problems, children may multiply by the wrong amount or add instead of multiply.
- When using a double number line in two-step proportion problems, children may count the step to zero and divide by the wrong amount.

## Key questions

- What is the multiplicative relationship between _____ and _____ ?
- If 3 _____ cost £ _____ , how much do 12 _____ cost?
- If 5 _____ cost £ _____ , how can you work out what 1 _____ costs?
- Once you know what 1 _____ costs, how can you work out what 8 _____ cost?
- How can a double number line help you solve this proportion problem?

## Possible sentence stems

- If _____ costs _____ , then _____ costs _____
- To get from _____ to _____ , I multiply/divide by _____
- To find the cost of 1 _____ , I will ...

### National Curriculum links

- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts

# Proportion problems

## Key learning

- 4 pens cost £2.68
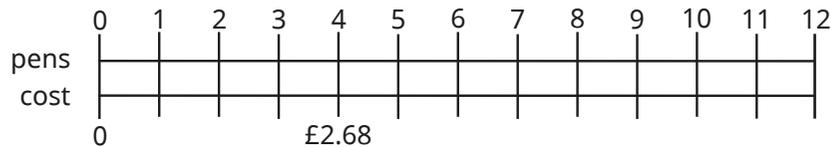


  - ▶ Use the double number line to work out the cost of 12 pens.

  - ▶ Use a double number line to help you work out the cost of buying:

    - 36 pens

    - 360 pens

  - ▶ Use a double number line to help you work out how many pens can be bought for:

    - £1.34

    - £26.80

- Eva buys 3 bread rolls for 75p.



  > If I know the cost of 3 bread rolls, I can work out the cost of 1 bread roll by dividing by 3
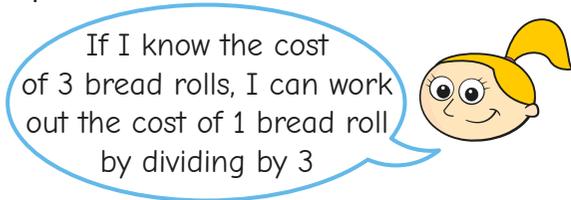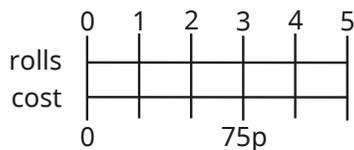
  Tell a partner how this will help Eva to find the cost of 5 bread rolls.

  What is the cost of 5 bread rolls?

- 3 tables have a total mass of 120 kg.

  Dexter and Annie are working out the mass of 9 tables.
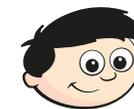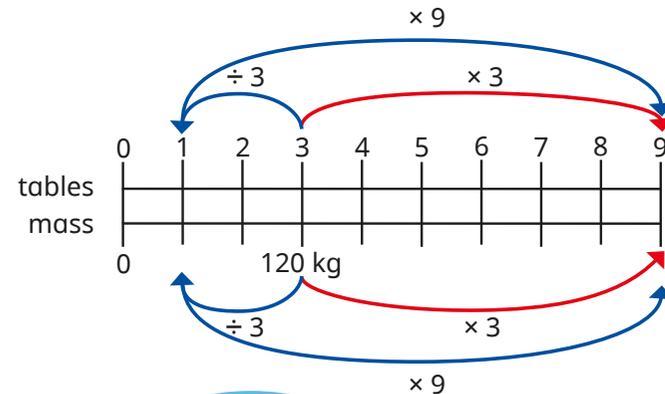


  > I can divide 120 by 3 to find the mass of 1 table and then multiply by 9

  Dexter
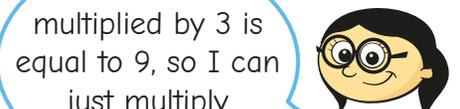
  > I know 3 multiplied by 3 is equal to 9, so I can just multiply 120 by 3

  Annie

  Use both methods to find the mass of 9 tables.

  Whose method do you prefer?

- A shop sells flour at the price of 54p for 0.3 kg.

  How much would it cost to buy these masses of flour?

| 150 g | 700 g | 2 kg | 5.2 kg |

# Proportion problems

## Reasoning and problem solving

The cost of 9 chocolate bars is £3.60

```
       0   1   2   3   4   5   6   7   8   9   10
bars   |---|---|---|---|---|---|---|---|---|---|
cost
       0                                   £3.60
```
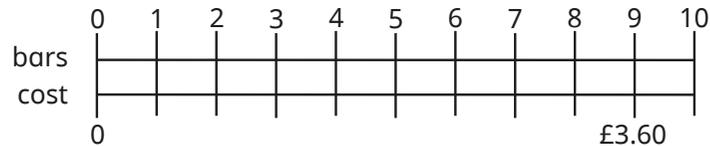
If 9 chocolate bars cost £3.60, then 10 chocolate bars will cost £4.60

Do you agree with Tiny?

Explain your answer.

No

Tiny has added £1, but each chocolate bar does not cost £1

1 chocolate bar costs £3.60 ÷ 9 = 40p

10 chocolate bars cost 40p × 10 = £4

---

It costs a company 12p to make 10 marbles.

Marbles are sold in boxes of 500 for £6.50

How much profit does the company make on every box of marbles?

How did you work it out?

50p

---

A car travelling at a constant speed travels 24 km in 12 minutes.

How far will the car travel in 1 hour?

How long will it take the car to travel 84 km?

How did you work it out?

120 km

42 minutes