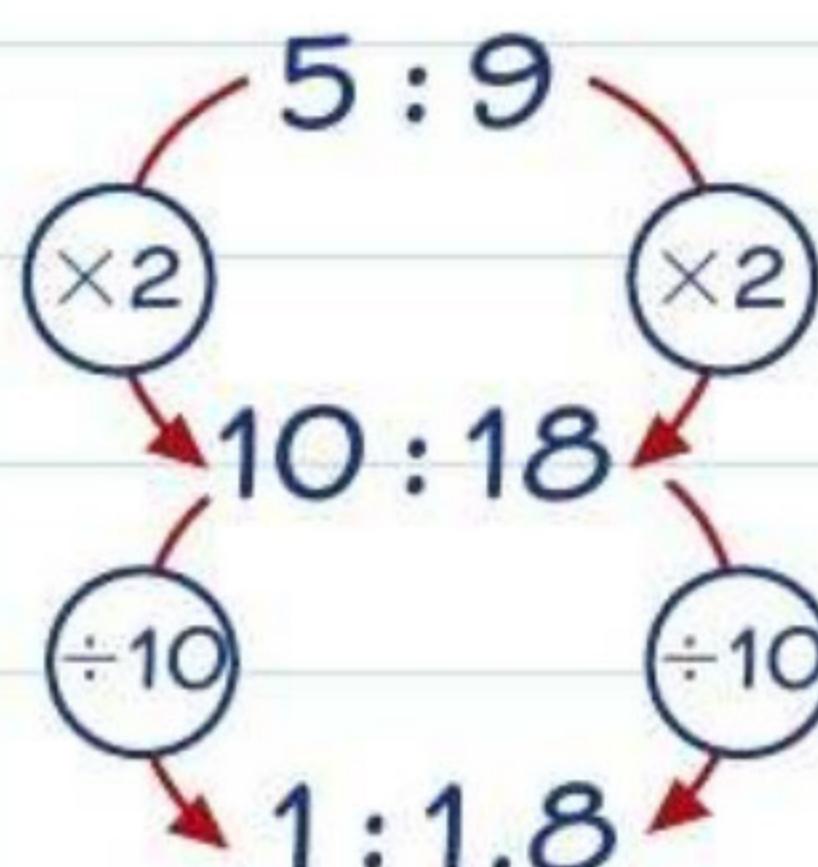


Ratio

Ratios are used to compare quantities.

You can find equivalent ratios by multiplying or dividing by the same number.



This equivalent ratio is in the form $1:n$. This is useful for calculations.

Simplest form

To write a ratio in its simplest form, find an equivalent ratio with the smallest possible whole number values.

Simplest form
5:1 10:9
2:3:4

Not simplest form
10:2 1:0.9
1:1.5:2

Worked example

Target grade 4

Alexis and Nisha share a flat. They decide to split their phone bill in the ratio 3 : 5. Alexis pays £78. How much does Nisha pay?

(2 marks)

$$78 \div 3 = 26$$

$$26 \times 5 = 130$$

Nisha pays £130

Work out the value of one part of the ratio first. You could also use equivalent ratios to solve this problem. Work out how many 3s go into 78 to find the multiplier.



Check it!

$$\text{£130} + \text{£78} = \text{£208}$$

Divide £208 in the ratio 3 : 5

$3 + 5 = 8$ parts in the ratio in total

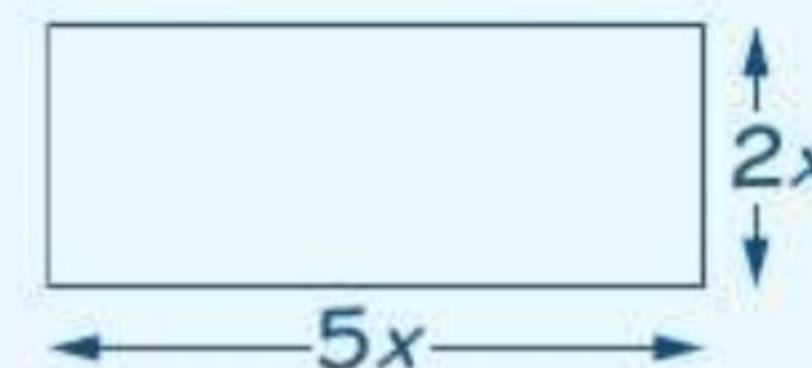
$$\text{£208} \div 8 = \text{£26}$$

$$\text{£26} \times 3 = \text{£78} \checkmark$$

Worked example

Target grade 5

Larissa is making a rectangular table top. The area of her table top is 4410 cm^2 . The length and width of her table top are in the ratio 5 : 2. Find the perimeter of her table top. (4 marks)



$$2x \times 5x = 4410$$

$$10x^2 = 4410 \quad (\div 10)$$

$$x^2 = 441$$

$$x = \pm 21$$

$$\text{Length} = 5 \times 21 = 105 \text{ cm}$$

$$\text{Width} = 2 \times 21 = 42 \text{ cm}$$

$$\text{Perimeter} = 105 + 42 + 105 + 42 = 294 \text{ cm}$$



If you use x to represent one part of the ratio, then you can write the length of the rectangle as $5x$ and the width as $2x$. Then form and solve an equation to find x . You can solve an equation like $10x^2 = 4410$ directly. Divide both sides by 10, then take square roots. Here x is a length so you can ignore the negative answer.

Now try this

Andre and Becky receive 9 parts of the ratio in total, and Chrissie receives 7.

Target grade 4

1 Andre, Becky and Chrissie share some money in the ratio 3 : 6 : 7

In total Andre and Becky receive £207.

Work out the amount of money

Chrissie receives.

(2 marks)

2 The ratio of Amir's age to Petra's age is 3 : 7. Amir is 9 years old.

(a) Work out Petra's age.

(2 marks)

The ratio of Karl's age to Yasmina's age is 5 : 2.

The sum of their ages is 84.

(b) Work out Yasmina's age.

(2 marks)