# DIRECT AND INVERSE PROPORTION Ratio and Proportion

# **Key Concepts**

Variables are directly proportional when the ratio is constant between the quantities.

Variables are inversely proportional when one quantity increases in proportion to the other decreasing.

# **Examples**

## **Direct proportion:**

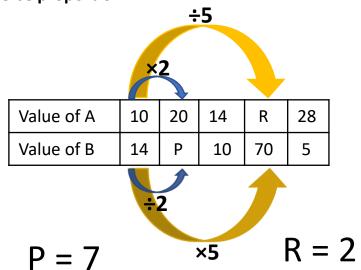
Value of A	32	Р	56	20	72
Value of B	20	30	35	R	45

**Ratio constant:**  $20 \div 32 = \frac{5}{8}$ 

From A to B we will multiply by  $\frac{5}{8}$ . From B to A we will divide by  $\frac{5}{8}$ .

$$P = 30 \div \frac{5}{8} = 48$$
  
 $\times \frac{5}{8} = 12.5$ 

## **Inverse proportion:**





42 R8 R13

## **Key Words**

Direct Inverse Proportion Divide Multiply Constant

### Complete each table:

1) Direct proportion

proportion Value of

Value of A	5	Р	22
Value of B	9	28.8	Q

## 2) Inverse

Value of A	4	Р	18
Value of B	9	3	Q

# DIVIDING AN AMOUNT INTO RATIOS Ratio and Proportion

## **Key Concepts**

An amount can be divided into a given ratio.

Red : Green 1:3

For every 1 red there are 3 greens.

A ratio can be converted into fractions.

Red : Green 1 : 3

 $\frac{1}{4}$  are red and  $\frac{3}{4}$  are green.

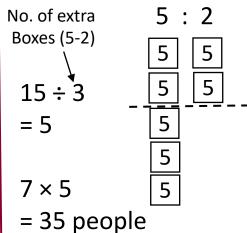
A woman has £400. She is going to split her money between her two children in the ratio 2:3. How much does each child receive?

No. of boxes 
$$(2+3)$$
  $\downarrow$   $80$   $80$   $400 \div 5$   $80$   $80$   $80$   $= 80$  £160  $80$  £240

Child 1 receives £160 and Child 2 receives £240.

There are boys and girls at a party in the ratio 5:2.

There are 15 more boys than girls. Calculate the number of people at the party.



**Examples** 

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38, 106

# **Key Words**

Ratio Divide Parts

- Ann made some cakes. She made vanilla cakes and chocolate cakes in the ratio 2:9. What fraction of the cakes were chocolate?
- Share £25 in the ratio 7:3
- 3) Katy and Becky share some money in the ratio 2:1. Katy receives £10 more than Becky. How much do they each receive?
- 4) Claire and John share some money in the ratio 3:2. Claire receives £18. How much does John receive?

# RATIO AND DIRECT PROPORTION Ratio and Proportion

## **Key Concepts**

To calculate the value for a single item we can use the unitary method.

When working with best value in monetary terms we use:

$$Price \ per \ unit = \frac{price}{quantity}$$

In recipe terms we use:

$$Weight per unit = \frac{weight}{quantity}$$

If 20 apples weigh 600g. How much would 28 apples weigh?

$$600 \div 20 = 30g \longrightarrow \text{weight of 1 apple}$$

$$30 \times 28 = 840g$$

Box A has 8 fish fingers costing £1.40. Box B has 20 fish fingers costing £ 3.40. Which box is the better value?



$$A = \frac{£1.40}{8}$$
  $B = \frac{£3.40}{20}$   
= £0.175 = £0.17

Therefore Box B is better value as each fish finger costs less.

# **Examples**

The recipe shows the ingredients needed to make 10 Flapjacks.
How much of each will be needed to make 25 flapjacks?

#### Ingredients for 10 Flapjacks

80 g rolled oats

60 g butter

30 ml golden syrup

36 g light brown sugar

### Method 1: Unitary

 $80 \div 10 = 8$   $30 \div 10 = 3$   $8 \times 25 = 200g$   $3 \times 25 = 75g$ 

 $60 \div 10 = 6$   $36 \div 10 = 3.6$  $6 \times 25 = 150g$   $3.6 \times 25 = 90g$ 

#### Method 2: 5 flapjacks

 $80 \div 2 = 40$   $30 \div 2 = 15$   $40 \times 5 = 200g$   $15 \times 5 = 75g$ 

 $60 \div 2 = 30$   $36 \div 2 = 18$   $30 \times 5 = 150g$   $18 \times 5 = 90g$ 

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42

## **Key Words**

Unitary
Best Value
Proportion
Quantity

Ingredients to make 16 gingerbread men

> 180 g flour 40 g ginger 110 g butter 30 g sugar

1) How much will we need to make 24 gingerbread men? 2) Packet A has 10 toilet rolls costing £3.50. Packet B has 12 toilet rolls costing £3.60. Which is better value for money?

3) If 15 oranges weigh 300g. What will 25 oranges weigh?