

What do I need to be able to do?

You should be able to:

- Multiply unit fractions
- Multiply non-unit fractions
- Use cross-cancelling to simplify fractions before multiplying
- Divide integers by fractions
- Divide fractions by fractions
- Find fractions of amounts
- Use a given fraction to find the whole
- Find the reciprocal of an integer/fraction

FRACTIONS 2

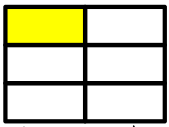
Key Words

- Numerator: the top number of a fraction
- Denominator: the bottom number of a fraction
- Unit fraction: a fraction with a numerator of one
- Commutative: changing the order of the operations doesn't change the result
- Reciprocal: the reciprocal of a number is 1 divided by the number
- Coprime: two numbers which share no common factors (except 1)

Multiplying unit fractions

$$\frac{1}{2} \times \frac{1}{3}$$

"One half of one third"



Split into thirds

$$= \frac{1}{6}$$

Split in half

Multiplying any fractions

See cross-cancelling for a quicker method

Example 1

$$\frac{2}{3} \times \frac{2}{5} = \frac{4}{15}$$

"Two thirds of two fifths"



Another way to think of it:

Two parts out of three parts on two out of five rows

Example 2

$$\frac{5}{7} \times \frac{14}{15} = \frac{5 \times 14}{7 \times 15} = \frac{70}{105}$$

Remember to simplify where possible

$$= \frac{2}{3}$$

Example 3

$$\frac{3}{2} \times \frac{7}{3} = \frac{21}{6} = \frac{7}{2} = 3\frac{1}{2}$$

Cross Cancelling Method

6 and 3 both have a common factor of 3, so we can divide both by 3

$$\frac{2}{3} \times \frac{6^2}{7} = \frac{4}{7}$$

This method means that we do not need to simplify our answer as it should be fully simplified already

Example 1

$$\frac{5}{9} \times \frac{18^2}{25^5} = \frac{2}{5}$$

this becomes

$$\frac{1}{1} \times \frac{2}{5} = \frac{2}{5}$$

Remember; Multiply the numerators then multiply the denominators

Example 2

$$\frac{15}{27} \times \frac{36^4}{45^3} = \frac{4}{9}$$

this becomes

$$\frac{1 \times 4}{3 \times 3} = \frac{4}{9}$$

Dividing integers by a unit fraction

$$3 \div \frac{1}{3}$$

Think of this as 'how many times does a third go into 3?'



there are three thirds in one whole, so there are 9 thirds in 3 wholes

Reciprocals

A number multiplied by its reciprocal is always 1

$$2 \times \frac{1}{2} = 1$$

$$5 \times \frac{1}{5} = 1$$

Dividing by a fraction, $\frac{1}{a}$, is the same as multiplying by its reciprocal, a

Example:

$$3 \div \frac{1}{3} = 9$$

$$3 \times 3 = 9$$

The reciprocal of a is $\frac{1}{a}$

Finding Fractions of Amounts

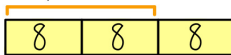
Find $\frac{1}{2}$ of 10

"Share 10 into 2 equal parts"



Find $\frac{2}{3}$ of 24

2 parts is 16



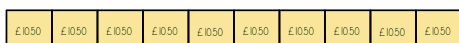
$$\frac{1}{3} \text{ is } 8 \text{ as } 24 \div 3 = 8$$

Each part must be worth 8

$$\frac{2}{3} \text{ of } 24 = 16$$

Find $\frac{7}{10}$ of £105

$$£105 \div 10 = £10.50$$

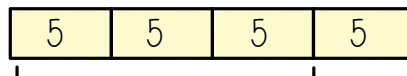


$$7 \times £10.50 = £73.50$$

$$\frac{7}{10} \text{ of } £105 = £73.50$$

Reverse Fractions of Amounts

$\frac{3}{4}$ of a number is 15. What is the number?

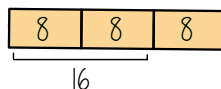


15

If 3 parts = 15, then one part must = 5

The original number was 20

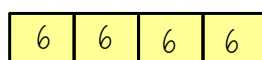
$\frac{2}{3}$ of a number is 16. What is $\frac{3}{4}$ of the number?



16

If 2 parts = 16, then one part must = 8

The number is $8 \times 3 = 24$. So what is $\frac{3}{4}$ of 24?



$$3 \times 6 = 18$$

$$= 18$$

Dividing Fractions

Example 1

$$\frac{2}{3} \div \frac{5}{7}$$

$$\frac{2}{3} \times \frac{7}{5}$$

$$\frac{2 \times 7}{3 \times 5}$$

$$\frac{14}{15}$$

Example 2

$$\frac{5}{12} \div \frac{25}{18}$$

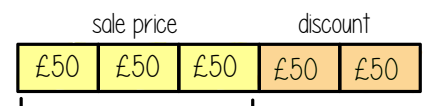
$$\frac{5}{12} \times \frac{18^3}{25^5}$$

$$\frac{1 \times 3}{2 \times 5}$$

$$\frac{3}{10}$$

Worded problem

A TV is on sale for $\frac{2}{5}$ off the price. It now costs £150. How much did it cost originally?



£150

So the original price of the TV was $5 \times £50 = £250$