

Quantitative skills

Fractions & Percentages

A fraction expresses a proportion using a numerator (the top number of the fraction) and a denominator (the bottom number of the fraction). Fractions are used to express proportions that are not whole numbers e.g. $\frac{1}{2}$ or $\frac{1}{4}$.

For example,

5 (the numerator)
100 (the denominator)

In the example above we can say that for 100 items of clothing a retailer sells, 5 items are returned by customers.

Another example is if a travel agent wants to work out the proportion of days that they are open they can express this as a fraction:

Number of days open in a year **313**
Total number of days in a year **365**

The travel agent is closed on Sundays so the numerator is calculated as $365 - 52 = 313$.

- Fractions can be converted into decimals by dividing the numerator by the denominator
- Fractions can be converted into percentages by dividing the numerator by the denominator and multiplying this by 100

For example, expressed as a decimal (to 2.d.p.), $313 / 365$ is 0.86, and as a percentage (to 2.d.p.) is 85.75%.

Percentages are a proportion of a hundred. For example, if labour turnover is 12%, this means that for every 100 people working for a business, there are 12 people leaving. Percentages can also help businesses to calculate the absolute number from a given total and percentage. For example, if 15% of calls made within a call centre are unanswered and there are 1 000 calls, the number of calls unanswered can be calculated as follows: $1\ 000 \times 0.15 = 150$ calls.

Therefore, if the percentage is 15%, then to convert it into a decimal, remove the percentage sign and place a decimal place two numbers to the left i.e. 15% becomes 0.15. This number can also be converted into a fraction: $150 / 1\ 000$.

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Example 1

Convert the following fractions to percentages. Remember to include the correct unit. Give your answers to 1.d.p where appropriate.

Fraction
$1/4$
$2/5$
$104/365$
$7/120$
$3/50$
$10/50$

Answer:

Fraction	Percentage
$1/4$	
$2/5$	
$104/365$	
$7/120$	
$3/50$	
$10/50$	

Example 2

If a business has 25% market share in a market with total revenue of £120bn, what is the revenue of this business? Remember to provide the appropriate units.

Answer:

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Example 3

Assume that the market for dog food in the UK is worth £780m and is dominated by 6 businesses, as below. Calculate the market share of the business with its market share missing:

Business	Market share (%)
Pedigree	30
Justin Welby	25
Waggy Tales	15
Canine Treats	10
Woof Biscuits	5
Mucky Paws	

Answer:

Example 4

A call centre has an average staff turnover of 15%. There are 400 people working at the call centre. How many people are likely to leave the company in a year if the staff turnover percentage is predicted to be the same?

Answer:

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Example 5

If three fifths of customers to a restaurant are returning customers and the average number of customers per evening is 80, how many customers might be returning customers on each evening?

Answer:

Example 6

A local manufacturer of glass vases has an average of 4% wastage of materials through breakage and error. If 350kg of glass is used in production, how many kgs of glass are likely to be wasted given this average?

Answer:

Example 7

Express the fraction $\frac{3}{4}$ as a percentage

Answer:

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Example 8

An industry has 4 businesses, each with the following sales revenue:

Company	Sales Revenue
A	£100 000
B	£150 000
C	£110 000
D	£250 000

Calculate the market share of Business B, as a percentage, giving your answers to 1 d.p.

Answer:

Example 9

Tents R Us has annual sales per year of £50m. The annual revenue for the tent market in the UK is £850m. Calculate the market share on Tents R Us (as a percentage, to 1.d.p.).

Answer:

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Example 10

A business sells four types of mattresses (the percentage produced for each type of mattress is in brackets). Standard (30%), Delux (15%), Luxury (20%) and Memory Foam. What percentage of mattresses produced are memory foam?

Answer:

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Answers

Example 1

Fraction	Percentage
$\frac{1}{4}$	25%
$\frac{2}{5}$	40%
$\frac{104}{365}$	28.5%
$\frac{7}{120}$	5.8%
$\frac{3}{50}$	6%
$\frac{10}{50}$	20%

Example 2

£30bn or £30 billion

Example 3

15% or 15

Example 4

60

Example 5

48

Example 6

14 or 14kg

Example 7

75%

Example 8

24.6%

Example 9

5.9%

Example 10

35%