"Full Coverage": Percentages

This worksheet is designed to cover one question of each type seen in past papers, for each GCSE Higher Tier topic. This worksheet was automatically generated by the DrFrostMaths Homework Platform: students can practice this set of questions interactively by going to www.drfrostmaths.com/homework, logging on, *Practise → Past Papers/Worksheets* (or *Library → Past/Past Papers* for teachers), and using the 'Revision' tab.

Question 1

Categorisation: Determine a percentage of an amount.

[Edexcel GCSE Nov2013-2H Q2b Edited]

Katie has a tin of chocolates.
There are 80 chocolates in the tin.
45% of the chocolates have toffee in the middle.

Work out the number of chocolates that have toffee in the middle.

....

Question 2

Categorisation: Determine a percentage of an amount involving a percentage above 100%.

[Edexcel GCSE June2016-2F Q23c, June2016-2H Q6c]

Tom is a ski jumper.

The maximum length of skis he can use is 145% of his height.
Tom's height is 1.80 m.

(c) Work out the maximum length of skis Tom can use.

.... m

Question 3

Categorisation: Solve wordier multi-step problems involving finding the percentage of an amount.

[Edexcel GCSE(9-1) Mock Set 1 Autumn 2016 2F Q16]

In September Sharon paid £565 for some books.
She sold all the books for a total of £780

In October Sharon bought and sold some more books.
The total profit she made in October was 13% greater than the total profit she made in September.

In November Sharon wants to pay a bill of £30
Sharon thinks that the 13% extra profit she made in October will be enough to pay this bill.

Is Sharon correct?
You must show all your working.

[   ] Yes

[   ] No

Question 4

Categorisation: Determine what percentage one amount is of another.

[Edexcel GCSE Nov2005-4I Q7a]

A doctor has 12 000 patients.

4560 of these patients are male.

What percentage of these patients are **female**?

.... %

Question 5
Categorisation: Determine a value after a percentage change.

[Edexcel IGCSE May2014-4H Q4a]

In a sale, all normal prices are reduced by 15%.

The normal price of a washing machine is 270 dollars.

Work out the sale price of the washing machine.

.... dollars

Question 6
Categorisation: Solve wordier multi-step problems involving a value after a percentage change.

[Edexcel IGCSE May2014(R)-4H Q6]

Kim bought 12 boxes of drinks.
He paid $15 for each box.
There were 12 drinks in each box.
Kim sold $\frac{3}{4}$ of the drinks for $1.50 each.
He sold all of the other drinks at a reduced price.

He made an overall profit of 15%.

Work out how much Kim sold each reduced price drink for.

$ ....

Question 7
Categorisation: Determine the percentage change (using numbers in standard form).

[Edexcel GCSE June2007-4I Q23b, June2007-6H Q13b]

In 2003 the population of Great Britain was 6.0×10^7
In 2003 the population of India was 9.9×10^8

In 1933 the population of Great Britain was 4.5×10^7

Calculate the percentage increase in the population of Great Britain from 1933 to 2003.

Give your answer correct to one decimal place.

.... %

Question 8
Categorisation: Determine a value after a compound increase.

[Edexcel GCSE June2007-4I Q18, June2007-6H Q6]

 James invested £2000 for three years in an Internet Savings Account.
He is paid 5.5% per annum compound interest.

Work out the total interest earned after three years.

£ ....

Question 9
Categorisation: Determine a value after a compound decrease.

[Edexcel IGCSE May2015-4H Q12]

The value of a boat depreciates by 16% each year.
At the end of 2012, the value of the boat is £65000.

Work out the value of the boat at the end of 2015.

£ ....

Question 10
Categorisation: Determine a value after different compound increases.

[Edexcel IGCSE Jan2016-3H Q14a]

Liam invests £8000 in a savings account for 4 years.
The savings account pays compound interest at a rate of

4.5 % for the first year
2.75 % for all subsequent years.

Work out the value of Liam's investment at the end of 4 years.

£ ....

Question 11

Categorisation: Determine the number of years before a value increases to some multiple given some known percentage increase. (Note: Calculating the exact answer would require logarithms from A Level! Using some starting amount, keep multiplying by the multiplier, making use of the ANS key on your calculator, until you reach the desired amount)

Helena invests a sum of money into an account that pays 6% compound interest per annum.

Work out after how many years Helena will have trebled his investment.

Give your answer as a whole number of years.

.... years

Question 12

Categorisation: As above, but the amount of time required before a specified amount is reached.

[Edexcel GCSE June2009-4H Q19b]

Jaspir invested £2400 for n years in a savings account.
He was paid 7.5% per annum compound interest.

At the end of the n years he had £3445.51 in the savings account.

Work out the value of n .

$n = $ ....

Question 13

Categorisation: As above, but reaching some fraction of the original amount.

[Edexcel GCSE Nov2006-6H Q17]

Gwen bought a new car.
Each year, the value of her car depreciated by 9%.

Calculate the number of years after which the value of her car was 47% of its value when new.

.... years

Question 14

Categorisation: Determine the combined percentage change from two changes.

[Edexcel GCSE(9-1) Mock Set 2 Spring 2017 1H Q10]

Here are three rectangles.
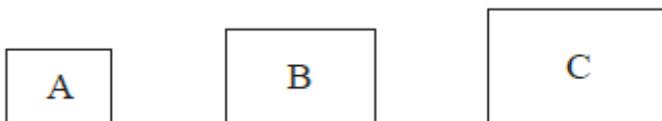
The area of rectangle **B** is 10% greater than the area of rectangle **A** .
The area of rectangle **C** is 10% greater than the area of rectangle **B** .

By what percentage is the area of rectangle **C** greater than the area of rectangle **A** ?

.... %

Question 15

Categorisation: Use the overall scale factor combined with a given time period to determine each percentage change in a compound change.
(Hint: If after 10 years a value had doubled, then we solve $r^{10} = 2$ where r is the decimal multiplier for each year. $\therefore r = \sqrt[10]{2} = 1.072 \rightarrow 7.2\%$)

I invest £1000 in a bank account which offers a fixed percentage interest per year. After 5 years I have £3000.

Determine the percentage increase each year, giving your answer to 1 decimal place.

.... %

Question 16

Categorisation: As above but with a percentage decrease.

[Edexcel GCSE(9-1) Mock Set 1 Autumn 2016 3H Q14]

The number of fish in a lake decreases by x% each year.

Given that the number of fish halves in 8 years, work out the value of x .
Give your answer correct to 1 decimal place.

$x = $ .... %

Question 17

Categorisation: Determine a value before a percentage increase.

[Edexcel IGCSE May2014-3H Q12b]

Joe's savings increased by 4.5%.
His savings are now £125.40.

What were his savings before the increase?

£ ....

Question 18
Categorisation: Determine a value before a percentage decrease.

[Edexcel GCSE June2003-4I Q14c, June2003-6H Q3c Edited]

 A garage sells cars.
It offers a discount of 20% off the normal price for cash.

Dave pays £5200 cash for a car.

Calculate the normal price of the car.

£ ....

Question 19
Categorisation: Determine the original value if the percentage change and value change are given.

[Edexcel GCSE(9-1) Mock Set 2 Spring 2017 3F Q23]

 In a sale, normal prices are reduced by 17%.
The normal price of a washing machine is reduced by £42.50

Work out the sale price of the washing machine.

£ ....

Answers

Question 1

36

Question 2

2.61 m

Question 3

No

Question 4

62 %

Question 5

229.50 dollars

Question 6

$ 1.25

Question 7

33.3 %

Question 8

£ 348.48

Question 9

any value in the range £ 38525 to £ 38526

Question 10

any value in the range £ 9068.8 to £ 9069

Question 11

19 years

Question 12

$n = 5$

Question 13

8 years

Question 14

21 %

Question 15

24.6 %

Question 16

any value in the range $x = 8.29$ % to $x = 8.3$ %

Question 17

£ 120

Question 18

£ 6500

Question 19

£ 207.50