

Lesson 7

GCSE (Year 10) Mathematics Percentages II

Calculator Needed !

7.1 Test

Marks available : 72

Question 1

(i) What is 85% of £12 ?

[2 marks]

(ii) Increase 350 kg by 62%

[2 marks]

(iii) Decrease 5800 bananas by 72%

[2 marks]

(iv) What percentage of \$65 is \$39 ?

[2 marks]

Question 2

Here are the masses of the eight planets in our solar system,

Planet	Mass ($\times 10^{24}$ kg)
Mercury	0.330
Venus	4.87
Earth	5.97
Mars	0.642
Jupiter	1898
Saturn	568
Uranus	86.8
Neptune	102

What percentage of the mass of Earth is the mass of the Mars ?

[3 marks]

Question 3

GCSE Examination Question from May 2019, Q5 (a)

Josh buys and sells books for a living

He buys 120 books for £4 each

He sells half of the books for £5 each

He sells 40% of the books for £7 each

He sells the rest of the books for £8 each

Calculate Josh's percentage profit

[5 marks]

Question 4

GCSE Examination Question from June 2018, Q6

Hiran invests 20 000 rupee in an account for 3 years at 1.5% per year compound interest. Work out the total amount of money in the account at the end of 3 years.

Give your answer to the nearest rupee.

[3 marks]

Question 5

GCSE Examination Question from January 2019, Q9

Omar invests 6000 dirham for 4 years in a savings account.

He will get 1.5% per year compound interest.

Work out the total amount of interest Omar will have received by the end of 4 years.

Give your answer correct to the nearest dirham

[3 marks]

Question 6

A water tank is 86% full

Once 40 litres of water is removed it is 22% full

How much water does the tank hold when it is half full ?

[3 marks]

Question 7

GCSE Examination Question from May 2018, Q12

A company makes cars.

In 2016 the company made 350 cars.

In the first 6 months of 2017 the company made 25 cars each month.

In the last 6 months of 2017 the company made 45 cars each month.

- (a) Work out the percentage increase in the number of cars the company made from 2016 to 2017

[4 marks]

The company's income in 2017 was \$500 000 more than the company's income in 2016. The company's income in 2017 was 8% more than the company's income in 2016.

- (b) Work out the company's income in 2016

[3 marks]

Question 8

SMC Question from November 2015, Q3

When Louise had her first car, 50 litres of petrol cost £40. When she filled up the other day, she noticed that 40 litres of petrol cost £50.

By what percentage has the cost of petrol increased over this time ?

[3 marks]

Question 9

In the United States 2016 Presidential election, an estimated 245,289,093 American's were entitled to vote. Of those entitled to vote, 136,626,025 turned out to do so.

President Trump was thus elected on what percentage turn out ?

[3 marks]

Question 10

GCSE Examination Question from June 2018, Q3

Gopal is paid 20 000 rupee each month.

Jamuna is paid 19 200 rupee each month.

Gopal and Jamuna are both given an increase in their monthly pay.

After the increase, they are both paid the same amount each month.

Gopal was given an increase of 8%

Work out the percentage increase that Jamuna was given.

[4 marks]

Question 11

Einstein's famous equation gives the theoretical maximum energy, E , (in joules) that can be obtained from a mass, m , (in kilograms) of “stuff”.

$$E = m c^2$$

where c is the speed of light, 3×10^8 m/s

- (i) Work out the amount of energy that is contained within 1 kg of stuff.
Give your answer in joules in standard form.

[3 marks]

A typical car engine, in burning one litre of petrol, extracts 3.78×10^7 joules of useful energy. This is, energy that results in the movement of a typical car between two places.

- (ii) When burning 1 kg, (equivalent to 1 litre) of petrol, what percentage of the theoretical maximum energy within the fuel is extracted by a car engine ?
Show the calculation made.

[3 marks]

- (iii) What is this question telling you about the energy extraction capability of mankind's latest high technology car engines ?

[2 marks]

Question 12

A square with sides of length w cm has its area increased by 44%

Given that after the increase the square has an area of 324 cm^2 what was the percentage increase in the perimeter of the original square ?

[4 marks]

Question 13

In 1989, 3% of the UK's population claimed they were Vegetarian.

In a 2019, 5.7% of the UK's population claimed they were Vegetarian.

What is the percentage increase in the number of Vegetarians in th UK over this time ?

(Data Source : Mori poll on 10 000 people : vegetarians include vegans)

[3 marks]

Question 14

The average Mini depreciates at a rate of 15 % per annum.

If a six year old Mini is worth £4450 what was it's price when new ?

[3 marks]

Question 15

A cube has each side increased by $x\%$

Find a formula in terms of x for the corresponding percentage increase in the volume of the cube.

[6 marks]

Question 16

When his daughter, Penny, was born, Mr Wise placed £2250 in a bank savings account that guarantees to pay interest, compounded annually at a rate of 4%, until the value of the savings has doubled.

The bank would then send Penny a cheque for £4500 and close the account.

How old will Penny be when she receives the cheque ?

Be as accurate as you can giving your answer in years, months and days.

[6 marks]

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Teachers may obtain detailed worked solutions to the exercises by email from MHHShrewsbury@Gmail.com