

Mock Grade 6

Maths

Booklet 1

Paper 3H
Calculator

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1 A company has to make a large number of boxes.

The company has 6 machines.

All the machines work at the same rate.

When all the machines are working, they can make all the boxes in 12 days.

The table gives the number of machines working each day.

	day 1	day 2	day 3	all other days
Number of machines working	3	4	5	6

Work out the total number of days taken to make all the boxes.

.....
(Total for Question 1 is 3 marks)

- 2 Marie invests £8000 in an account for one year.
At the end of the year, interest is added to her account.

Marie pays tax on this interest at a rate of 30%
She pays £432 tax.

Work out the percentage interest rate for the account.

..... %

(Total for Question 2 is 3 marks)

3 The mean distance between Earth and Neptune is 4.5×10^9 km.

In May 2019, a signal was sent from Earth to Mars.

Assuming that the signal sent from Earth to Mars travelled at a speed of 3×10^5 km per second,

(a) how long did the signal take to get to Mars?

..... seconds
(2)

The mean distance from Earth to Neptune is actually more than 4.5×10^9 km.

(b) How will this affect your answer to part (a)?

.....
.....
.....
(1)

(Total for Question 3 is 3 marks)

4 Patrick has to work out the exact value of $32^{\frac{1}{5}}$

Patrick says,

“ $\frac{1}{5}$ of 32 is 6.4 so $32^{\frac{1}{5}} = 6.4$ ”

Explain what is wrong with what Patrick says.

.....
.....
.....
(Total for Question 4 is 1 mark)

5 $T = \sqrt{\frac{w^2}{d^3}}$

$$w = 3.2 \times 10^{-3}$$

$$d = 6.9 \times 10^{-6}$$

(a) Work out the value of T .

Give your answer in standard form correct to 3 significant figures.

$$T = \dots\dots\dots$$

(2)

w is decreased by 5%

d is decreased by 10%

Lottie says,

“The value of T will decrease because both w and d are decreased.”

(b) Is Lottie correct?

Justify your answer.

(2)

(Total for Question 5 is 4 marks)

6 Here are three lamps.

lamp **A**



lamp **B**



lamp **C**



Lamp **A** flashes every 30 seconds.

Lamp **B** flashes every 48 seconds.

Lamp **C** flashes every 180 seconds.

The three lamps start flashing at the same time.

How many times in one hour will the three lamps flash at the same time?

.....
(Total for Question 6 is 3 marks)

7 In 2003, Jerry bought a house.

In 2007, Jerry sold the house to Mia.
He made a profit of 30%

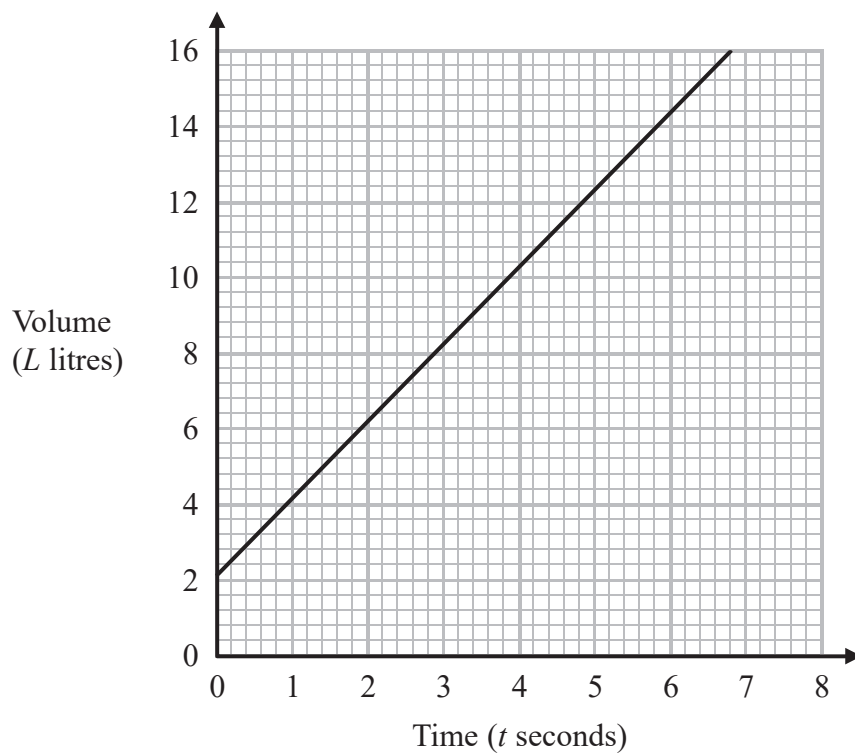
In 2012, Mia sold the house for £249 600
She made a loss of 20%

Work out how much Jerry paid for the house in 2003

£.....

(Total for Question 7 is 3 marks)

8 The graph shows the volume of liquid (L litres) in a container at time t seconds.



(a) Find the gradient of the graph.

.....
(2)

(b) Explain what this gradient represents.

.....
.....
(1)

The graph intersects the volume axis at $L = 2$

(c) Explain what this intercept represents.

.....
.....
(1)

(Total for Question 8 is 4 marks)

9 (a) Express $\sqrt{\frac{10^{520}}{10^{280} \times 10^{160}}}$ as a power of 10

.....
(3)

Liam was asked to express $(15^{20})^3$ as a power of 15

Liam wrote $(15^{20})^3 = 15^{20^3} = 15^{8000}$

Liam's method is wrong.

(b) Explain why.

.....
.....
.....
(1)

(Total for Question 9 is 4 marks)