

**Pre Paper 2H Practice**  
**June 2018**  
GCSE Mathematics (AQA style)

Higher Tier  
**Calculator Practice Paper**

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Name .....

Class .....

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**TIME ALLOWED**

1 hour 30 minutes

**INSTRUCTIONS TO CANDIDATES**

- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- You are permitted to use a calculator in this paper.
- You may use the  $\pi$  button on your calculator or you may take the value of  $\pi$  to be 3.142.
- Do all rough work in this book.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets at the end of each question or part question on the Question Paper.
- You are reminded of the need for clear presentation in your answers.
- The total number of marks for this paper is **80**.
- It is expected that you will need a calculator to answer every question on this paper. In this respect, the topics it includes may not fully reflect the balance or mix of topics tested on a typical paper.

Question	Mark	out of
1		1
2		1
3		1
4		1
5		4
6		3
7		3
8		3
9		3
10		7
11		3
12		5
13		5
14		5
15		3
16		2
17		3
18		8
19		3
20		5
21		8
22		3
Total		80

**There are no questions printed on this page**  
Answer **all** questions in the spaces provided

**1** How many minutes are there in 3 weeks?

Circle your answer.

**[1 mark]**

180

4320

10 080

30 240.

**2** Find the value of  $\sqrt[3]{2.985984}$ .

Circle your answer.

**[1 mark]**

0.995328

1.44

1.492992

1.728

**3** When rounded to 2 significant figures a number,  $x$ , is 60

What is the error interval for  $x$ ?

Circle your answer.

**[1 mark]**

$59.5 \leq x < 60.5$

$59 \leq x < 61$

$55 \leq x < 65$

$59.995 \leq x < 60.005$

**4** Find the value of  $19.71 - 16.47 \div 2.7$ .

Circle your answer.

**[1 mark]**

1.2

3.24

13.61

25.81

5 Donald writes the number 2018 as the sum of two prime numbers.  
One of Donald's numbers is between 540 and 550.  
What are the two numbers?

**[4 marks]**

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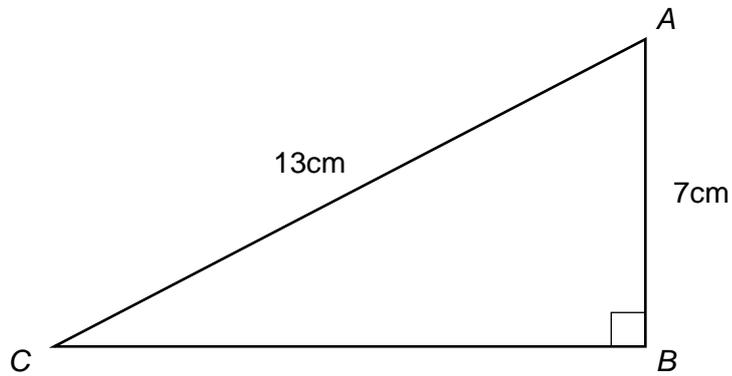
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Answer \_\_\_\_\_ and \_\_\_\_\_

- 6 Find the length of the side  $BC$ .  
Give your answer to 1 decimal place.



[3 marks]

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Answer \_\_\_\_\_ cm

7 Bottles of lemonade are sold in two sizes.



Which size represents the better value for money?

Tick a box.

The Economy bottle is better value for money.

The Regular bottle is better value for money.

You must show your working out.

[3 marks]

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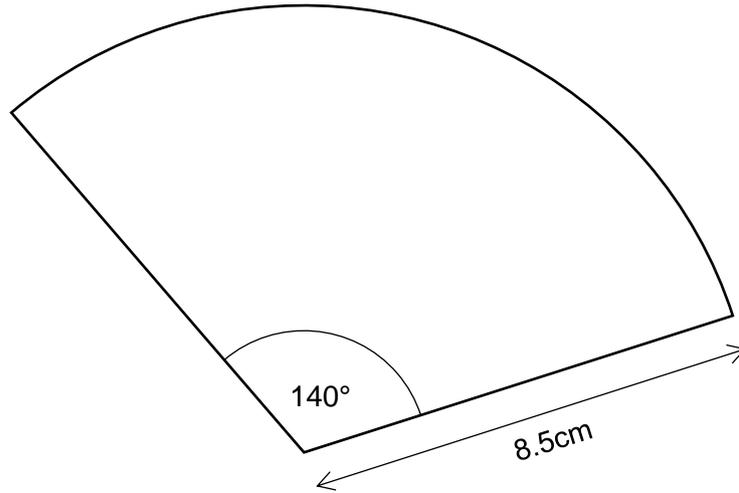
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8



Calculate the area of this sector.

[3 marks]

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Answer \_\_\_\_\_ cm<sup>2</sup>

- 9 In America, one gallon of petrol costs \$5.68  
In Britain, one litre of petrol costs £1.16

The exchange rate between American and British currency is £1 = \$1.39.

1 gallon is the same as 4.546 litres.

Is petrol more expensive in America or in Britain?

Tick a box.

Petrol is more expensive in America.

Petrol is more expensive in Britain.

The cost of petrol is the same in both countries.

You must show your working out.

**[3 marks]**

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**10 (a)** Calculate the value of  $\frac{1.72 \times 10^{-5}}{\sqrt{6.3 \times 10^{16}}}$ .

Give your answer in standard form.

[2 marks]

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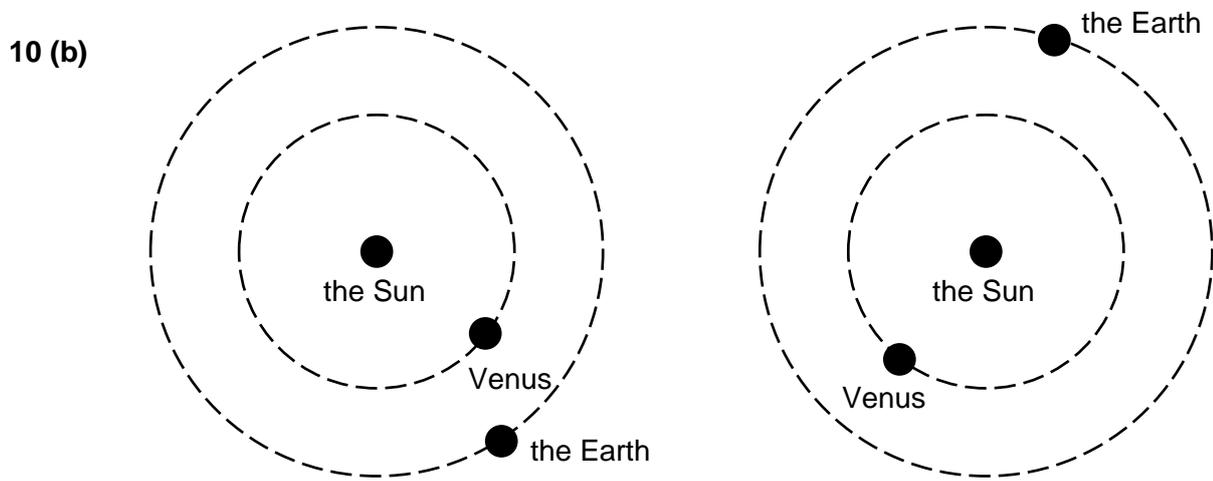


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Answer \_\_\_\_\_



Venus and the Earth both travel around the Sun.  
They travel at different speeds, so the distance between Venus and the Earth varies.

The distance from the Earth from the Sun is  $9.3 \times 10^7$  miles.  
The distance from Venus to the Sun is  $6.6 \times 10^7$  miles.

**10 (b) (i)** What is the greatest possible distance between Venus and the Earth?

Give your answer in standard form.

[2 marks]

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Answer \_\_\_\_\_ miles

**10 (b) (ii)** The ratio between the smallest and greatest possible distances between Venus and the Earth is  $1 : n$ .

Find the ratio  $1 : n$ , giving the value of  $n$  to the nearest integer.

**[3 marks]**

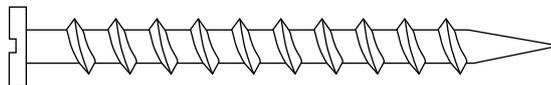
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Answer \_\_\_\_\_

**11**



The density of steel is  $8.05 \text{ g/cm}^3$ .

A pack of steel screws, all of which are identical, has a mass of 2kg.

There are 150 screws in the pack.

What is the volume of steel in each screw?

**[3 marks]**

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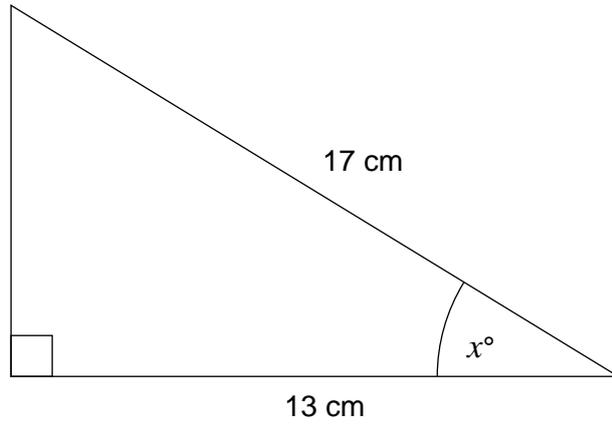
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Answer \_\_\_\_\_  $\text{cm}^3$

12 (a) Use trigonometry to find the angle marked  $x^\circ$



Not drawn accurately

[2 marks]

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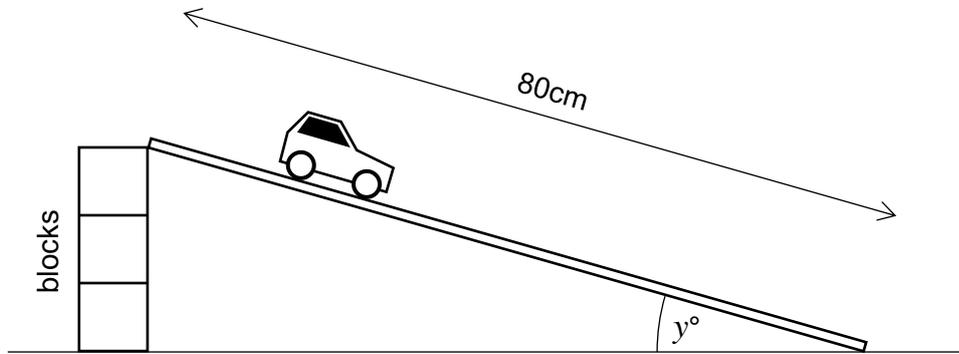
Answer \_\_\_\_\_<sup>o</sup>

12 (b) Amanda is playing with a toy car.

She has a length of wood that is 80cm long.

She has some blocks that are cubes, each with edges that are 7cm long.

Amanda puts one end of the length of wood on top of some these blocks.



Amanda knows the car will roll down the slope if the angle marked  $y^\circ$  is greater than  $20^\circ$

How many blocks, in total, must Amanda use to make the car roll down the slope?

[3 marks]

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Answer \_\_\_\_\_ blocks



14 The equation  $x^3 + x^2 - 200 = 0$  has a solution between 5 and 6.

14 (a) Show that the equation can be written in the form  $x = \sqrt[3]{200 - x^2}$

[2 marks]

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14 (b) Work out an approximate solution to  $x^3 + x^2 - 200 = 0$ .

Use the iteration  $x_{n+1} = \sqrt[3]{200 - (x_n)^2}$

Start with  $x_1 = 5$ .

Give your answer to 3 decimal places.

[3 marks]

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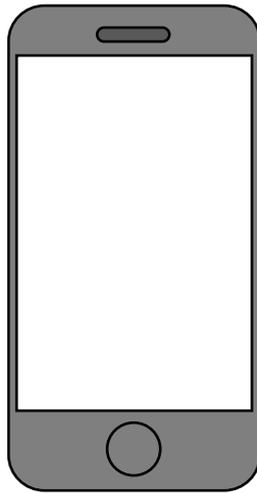
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Answer \_\_\_\_\_

15



The price of a smartphone is reduced by 32%.

Its new price is £374.

What was its price before the reduction?

**[3 marks]**

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Answer £ \_\_\_\_\_

16 Use your calculator to work out the value of  $\sqrt{\frac{1 + \tan 40^\circ}{1 - \tan 40^\circ}}$ .

Give your answer to two decimal places.

[2 marks]

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Answer \_\_\_\_\_

17 Solve the equation  $2x^2 + 4x - 9 = 0$ .

Give your solutions to three significant figures.

[3 marks]

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Answer \_\_\_\_\_

**18** As cars pass a safety camera, their speeds are recorded.

The table summarises the speeds at which the cars were travelling.

Speed ( $x$ mph)	Number of cars		
$40 < x \leq 50$	3		
$50 < x \leq 60$	34		
$60 < x \leq 70$	20		
$70 < x \leq 80$	15		

**18 (a)** Work out an estimate of the mean speed of the cars.

**[4 marks]**

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Answer \_\_\_\_\_ mph

**18 (b)** Which **one** of these statements, about the mean and the median of the speeds, is true?

Tick a box.

The mean is the same as the median.

The mean is greater than the median.

The mean is lower than the median.

It is not possible to tell which of the mean or median is greater.

You must explain how you chose your answer.

**[2 marks]**

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**18 (c)** The speed limit on the road was 70 mph.

Find the percentage of cars that were breaking the speed limit.

**[2 marks]**

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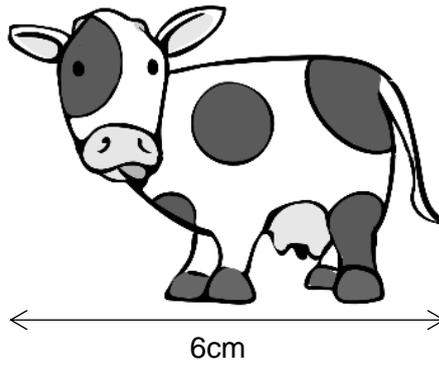
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Answer \_\_\_\_\_ %



A dairy uses this logo on its bottles.

The logo on a bottle containing two pints of milk is 6cm long.

A larger bottle, containing four pints of milk, is mathematically similar to the original. The logo is enlarged by the same scale factor as the bottle.

Find the length of the enlarged logo.

**[3 marks]**

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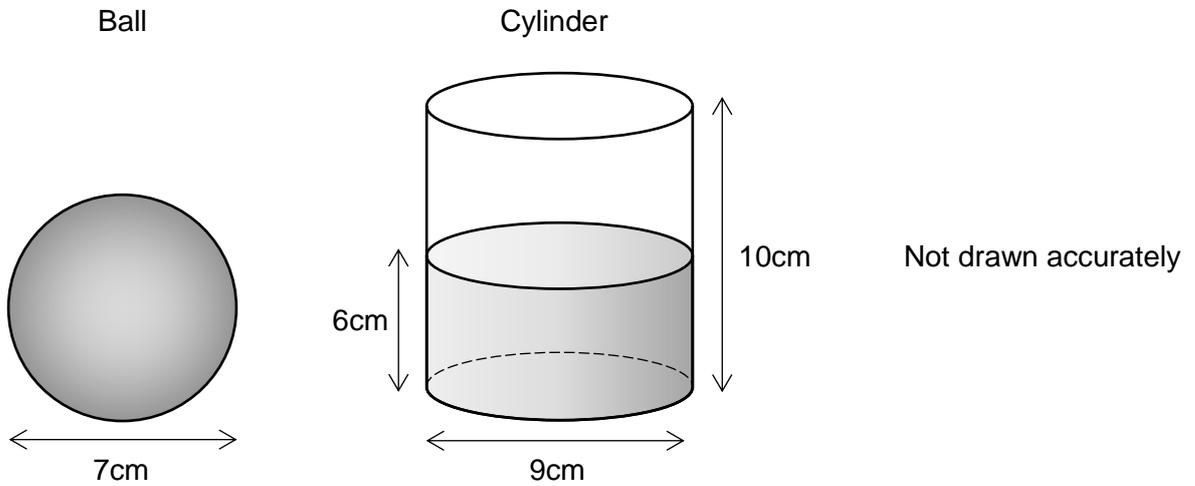
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Answer \_\_\_\_\_ cm

20

All the lengths in this question were measured to the nearest whole centimetre.

You may use this formula for the volume of a sphere;  $V = \frac{4}{3} \times \pi \times r^3$ .



The diameter of a spherical ball is 7cm.

When the ball is dropped into this cylinder of water, it sinks completely.

Use bounds to show that dropping the ball into the cylinder could cause the water to overflow.

You must show all your working out.

[5 marks]

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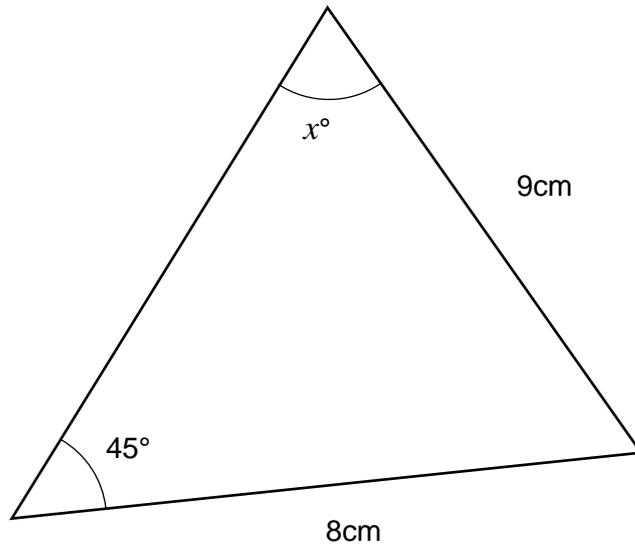
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21 (a) Find the size of the angle marked  $x^\circ$  in this triangle.



[3 marks]

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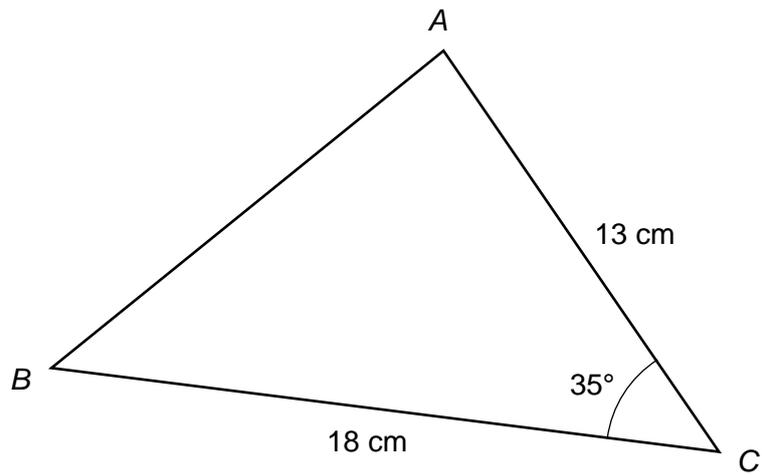
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Answer \_\_\_\_\_ cm

21 (b)



21 (b) (i) Find the area of triangle ABC .

[2 marks]

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Answer \_\_\_\_\_ cm<sup>2</sup>

21 (b) (ii) Find the length of AB.

[3 marks]

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Answer \_\_\_\_\_ cm

- 22** The level of radiation,  $R$ , emitted by a radioactive substance can be predicted using the formula

$$R = 400 \times 0.5^{(0.04t)}$$

where  $t$  is the number of seconds after the radiation was first detected.

- 22 (a)** What is the initial value of  $R$ ?

Circle your answer.

[1 mark]

0                      100                      200                      400

- 22 (b)** What is the value of  $R$  after 2 seconds?

Circle your answer.

[1 mark]

1.528                      16                      200                      378

- 22 (c)** The half life of the radioactive substance is the value of  $t$  at which  $R$  reaches half its initial value.

What is the half life of this substance?

Circle your answer.

[1 mark]

$\frac{1}{25}$                       0.25                      25                      200

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