

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

Higher Tier
Calculator Practice Paper

Name

Class

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 π button on your calculator or you may take the value of π 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

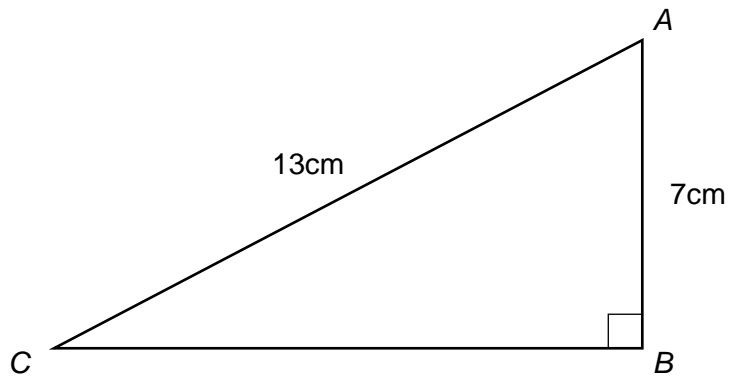
25.81

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]

Answer _____ and _____

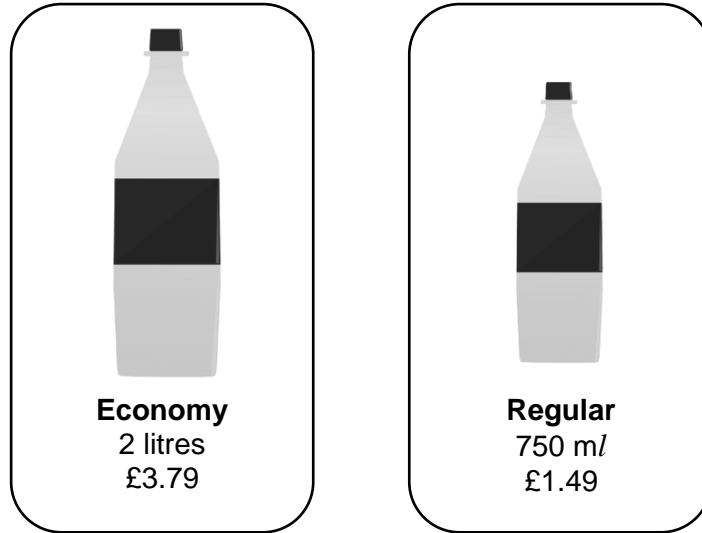
- 6 Find the length of the side BC .
Give your answer to 1 decimal place.



[3 marks]

Answer _____ cm

7 Bottles of lemonade are sold in two sizes.



Which size represents the better value for money?

Tick a box.

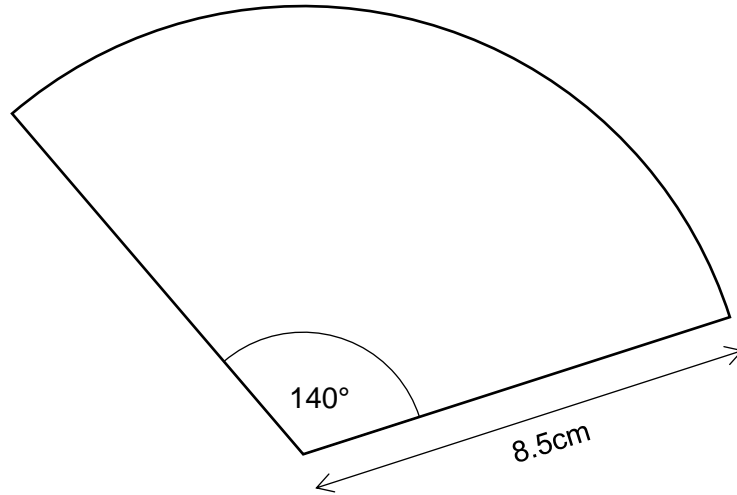
The Economy bottle is better value for money.

The Regular bottle is better value for money.

You must show your working out.

[3 marks]

8



Calculate the area of this sector.

[3 marks]

Answer _____ cm²

- 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.

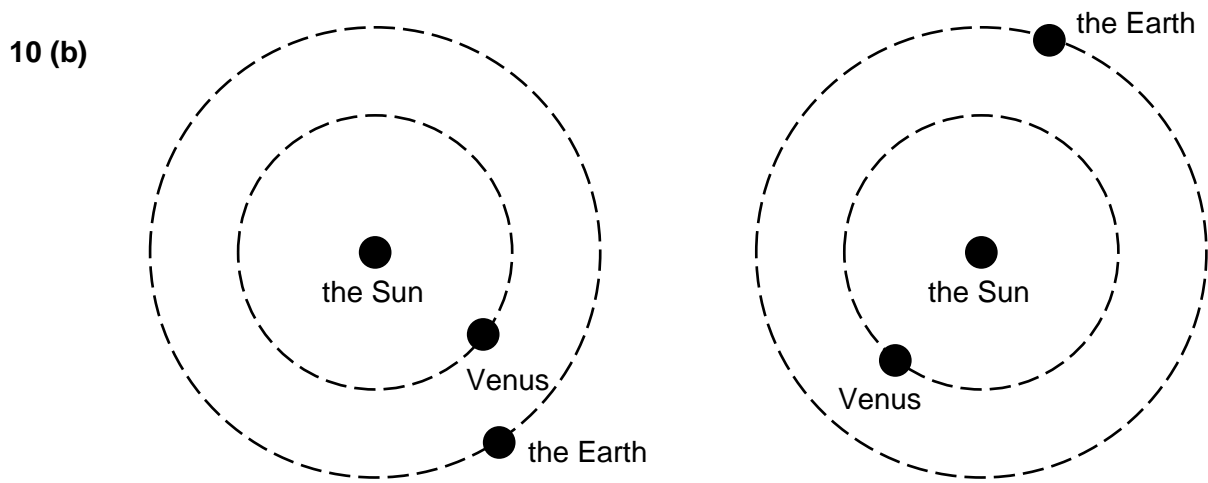
[3 marks]

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]

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 9.3×10^7 miles.
The distance from Venus to the Sun is 6.6×10^7 miles.

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

Give your answer in standard form.

[2 marks]

Answer _____ miles

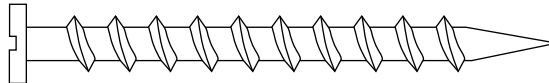
10 (b) (ii) The ratio between the smallest and greatest possible distances between Venus and the Earth is $1 : n$.

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

[3 marks]

Answer _____

11



The density of steel is 8.05 g/cm^3 .

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

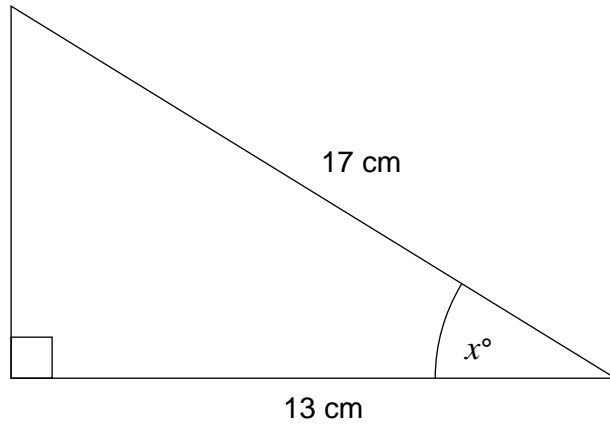
There are 150 screws in the pack.

What is the volume of steel in each screw?

[3 marks]

Answer _____ cm^3

12 (a) Use trigonometry to find the angle marked x°



Not drawn accurately

[2 marks]

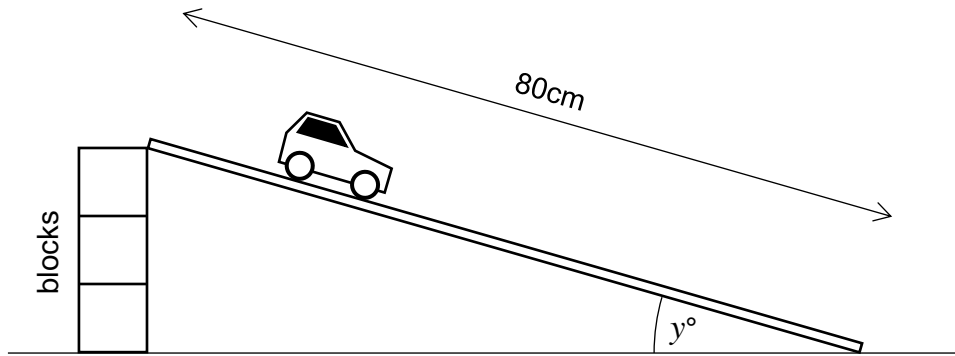
Answer _____^o

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° is greater than 20°

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

[3 marks]

Answer _____ blocks

13 (a) Which of these calculations decreases 68 by 5%?

Circle your answer.

[1 mark]

68×5

68×0.95

$68 \div 1.05$

68×1.05

13 (b) £4000 is invested in a savings account.

During the first year, 2.7% interest is paid into the savings account.
At the end of the first year, the rate is reduced to 2%, compound interest.

How much interest is paid into the savings account during the first four years.

[4 marks]

Answer £ _____

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]

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

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

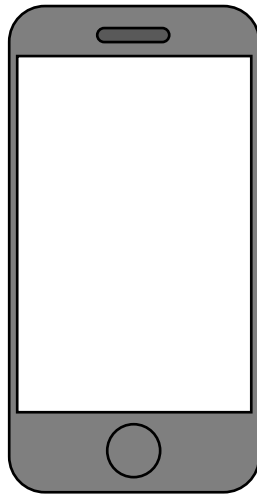
Start with $x_1 = 5$.

Give your answer to 3 decimal places.

[3 marks]

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]

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]

Answer _____

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

Give your solutions to three significant figures.

[3 marks]

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]

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.

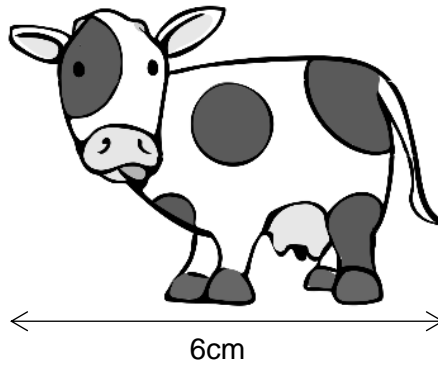
[2 marks]

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

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

[2 marks]

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.

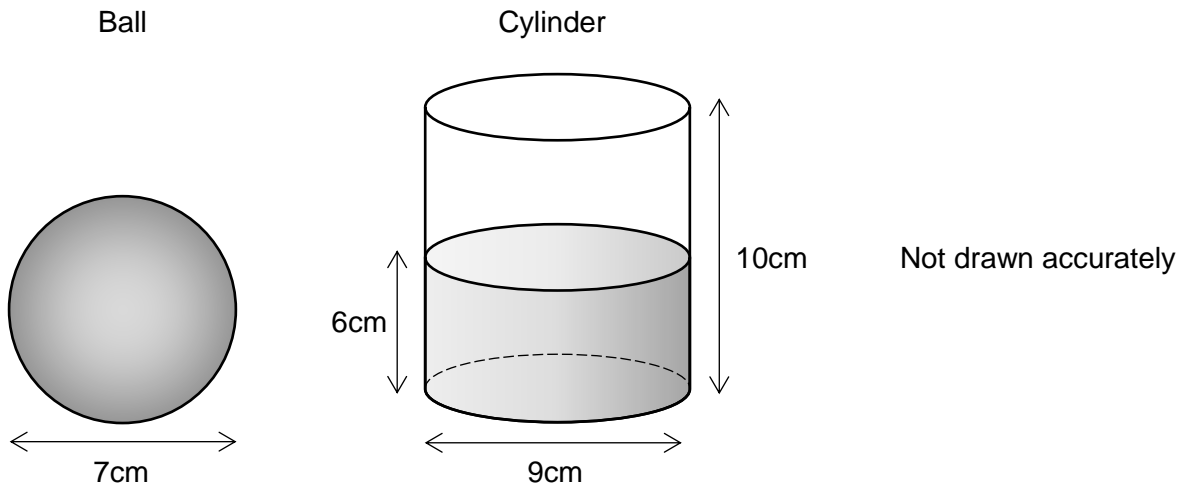
Find the length of the enlarged logo.

[3 marks]

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.

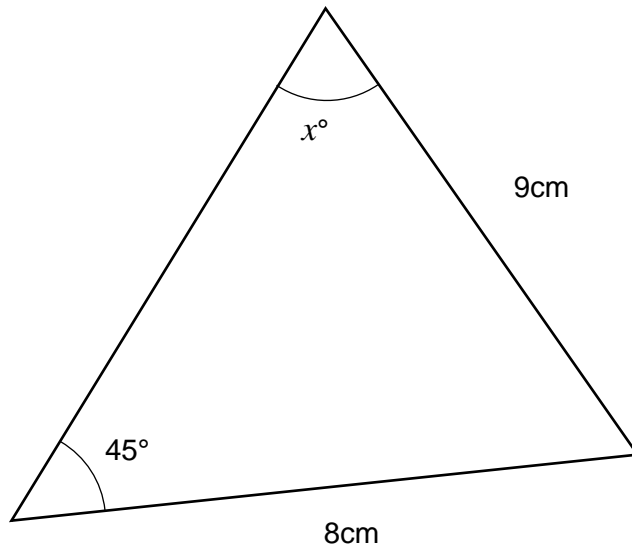
When the ball is dropped into this cylinder of water, it sinks completely.

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]

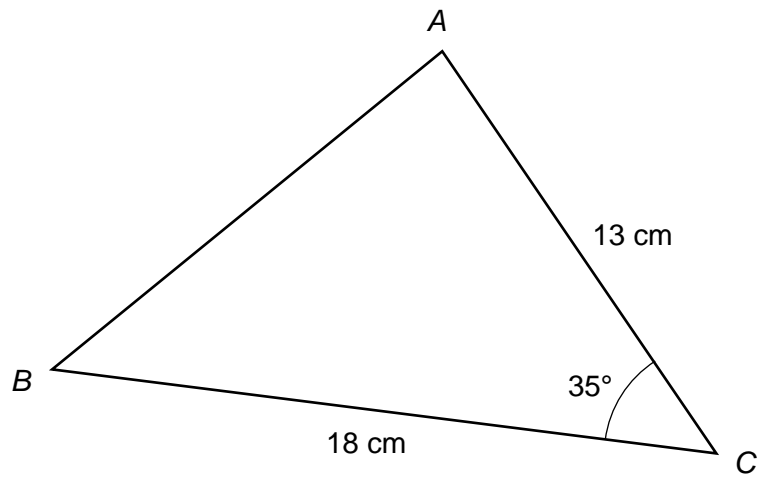
21 (a) Find the size of the angle marked x° in this triangle.



[3 marks]

Answer _____ cm

21 (b)



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

[2 marks]

Answer _____ cm²

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

[3 marks]

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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