GCSE MATHEMATICS · HIGHER

Targeting Grade 9

Paper 4 · Calculator · 50 minutes · 40 marks

Name ..... **Date** .....

Answer **all** questions. Show all your working: answers without working may not get full marks. Diagrams are **not** accurately drawn. You may use a calculator. If your calculator does not have a π button, take the value of π to be 3.142 unless the question says otherwise.

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1 The price of a bike is increased by $x\%$

The new price is then decreased by $x\%$

The final price is 4.84% less than the original price.

Work out the value of x.

$x =$ .....

(Total for Question 1 is 4 marks)

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2 y is directly proportional to x^3

x is inversely proportional to $\sqrt{z}$

The value of z is increased by 69%

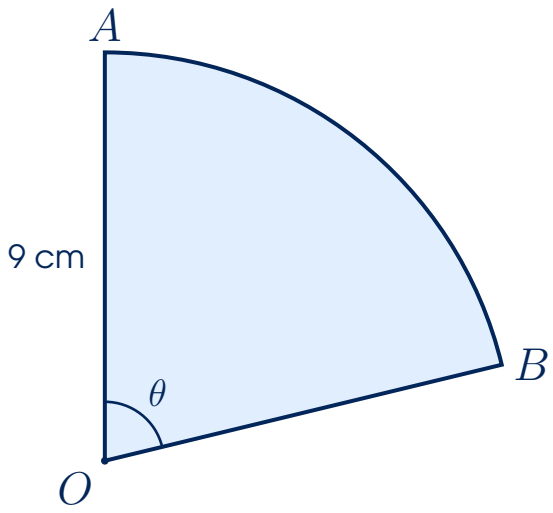
Work out the percentage change in the value of y.

Give your answer correct to 1 decimal place.

. . . . . .

(Total for Question 2 is 4 marks)

3



OAB is a sector of a circle, centre O, with radius 9 cm.

The perimeter of the sector is 30 cm.

(a) Work out the area of the sector.

cm^2 .....

(3)

(b) Work out the size of angle θ.

Give your answer correct to 1 decimal place.

° .....

(2)

(Total for Question 3 is 5 marks)

4 The curve with equation $y = ab^x$ passes through the points $(2,\ 36)$ and $(5,\ 121.5)$

a and b are positive constants.

(a) Work out the value of a and the value of b.

$a =$ .....

$b =$ .....

(3)

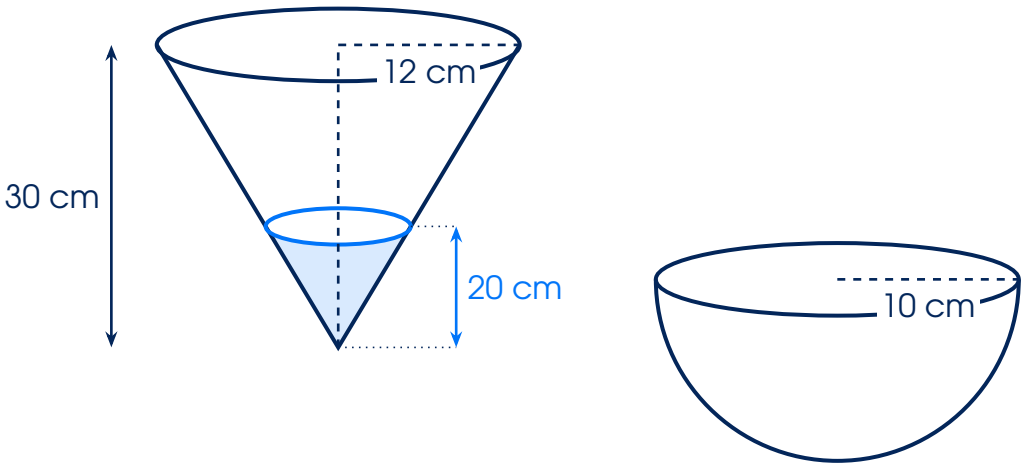
(b) Find the smallest integer value of x for which $y > 1000$

$x =$ .....

(2)

(Total for Question 4 is 5 marks)

5



A container is in the shape of a cone with its vertex at the bottom.

The cone has radius 12 cm and height 30 cm.

Water is poured into the container to a depth of 20 cm.

All of this water is then poured into an empty bowl.

The bowl is a hemisphere with radius 10 cm.

What percentage of the bowl is filled with water?

You must show all your working.

Volume of a cone $= \frac{1}{3}\pi r^2 h$

Volume of a sphere $= \frac{4}{3}\pi r^3$

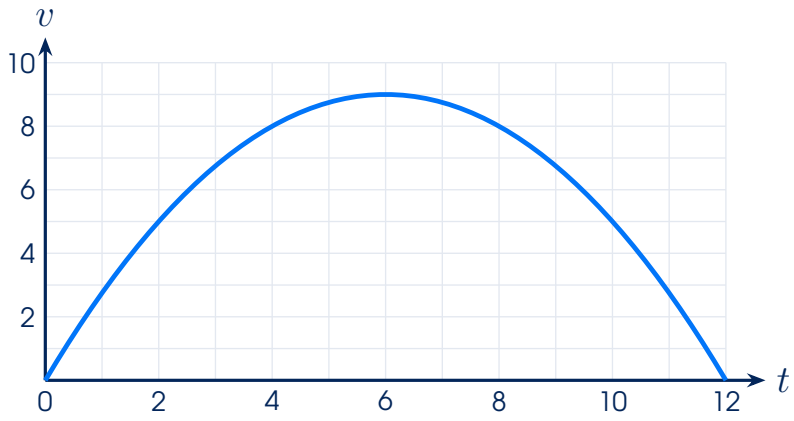
% .....

(Total for Question 5 is 5 marks)

6 A particle moves in a straight line.

Its velocity, v m/s, t seconds after it starts is given by

$$v = 3t - 0.25t^2 \qquad 0 \leqslant t \leqslant 12$$



(a) Use 4 strips of equal width to estimate the distance travelled by the particle in the 12 seconds.

m .....

(4)

(b) Is your answer to (a) an overestimate or an underestimate?

Give a reason for your answer.

.....

(1)

(Total for Question 6 is 5 marks)

7 A regular pentagon has an area of 100 cm^2

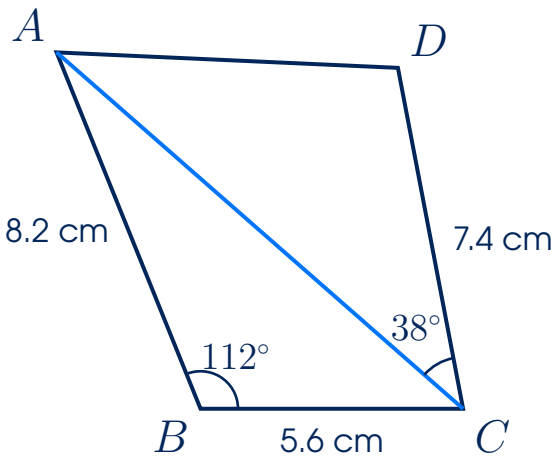
Work out the perimeter of the pentagon.

Give your answer correct to 3 significant figures.

cm .....

(Total for Question 7 is 6 marks)

8



$ABCD$ is a quadrilateral.

$AB = 8.2$ cm, $BC = 5.6$ cm, $CD = 7.4$ cm

Angle $ABC = 112°$ and angle $ACD = 38°$

Work out the area of $ABCD$.

Give your answer correct to 3 significant figures.

cm^2 .....

(Total for Question 8 is 6 marks)

TOTAL FOR PAPER IS 40 MARKS