

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

GCSE MATHEMATICS

H

Higher Tier

Paper 1 Non-Calculator

Thursday 25 May 2017

Morning

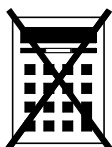
Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- mathematical instruments.

You must **not** use a calculator.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

For Examiner's Use

Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
24–25	
TOTAL	



J U N 1 7 8 3 0 0 1 H 0 1

Answer **all** questions in the spaces provided

- 1** Simplify $2^5 \times 2^3$
Circle your answer.

[1 mark]

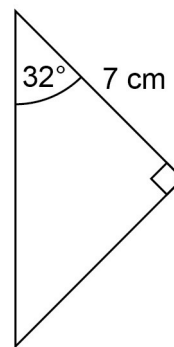
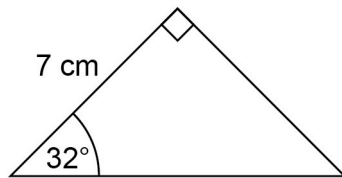
4^8

2^8

2^{15}

4^{15}

2



Not drawn
accurately

Circle the reason why these triangles are congruent.

[1 mark]

SSS

SAS

ASA

RHS

- 3** Which of these is a geometric progression?
Circle your answer.

[1 mark]

2, 4, 6, 8, 10

2, 3, 5, 8, 12

2, 6, 18, 54, 162

2, 6, 10, 14, 18



4 $a : b = 4 : 3$

Circle the correct statement.

[1 mark]

b is $\frac{4}{7}$ of a

b is $\frac{3}{7}$ of a

b is $\frac{4}{3}$ of a

b is $\frac{3}{4}$ of a

5 Write 36 as a product of prime factors.

Give your answer in index form.

[3 marks]

Answer _____

Turn over for the next question

Turn over ►



- 6** The table shows information about the times for 10 people to complete a task.

Time, t (minutes)	Frequency
$0 < t \leq 20$	1
$20 < t \leq 40$	6
$40 < t \leq 60$	3

These statements are about the mean and range of the actual times.

Tick the correct box for each statement.

[4 marks]

	True	False
The mean could be less than 20 minutes	☐	☐
The mean could be more than 40 minutes	☐	☐
The mean could be less than 40 minutes	☐	☐
The range could be more than 40 minutes	☐	☐
The range could be less than 40 minutes	☐	☐
The range could be more than 60 minutes	☐	☐



- 7 $\frac{3}{5}$ of a number is 162

Work out the number.

[2 marks]

Answer _____

- 8 x km/h = y mph

Use 8 km/h = 5 mph to write a formula for y in terms of x .

[2 marks]

Answer _____

Turn over for the next question



9 (a) $\text{Density} = \frac{\text{mass}}{\text{volume}}$

The mass of solid A is 6 times the mass of solid B.

The volume of solid A is 3 times the volume of solid B.

Complete the sentence.

[1 mark]

The density of solid A is _____ times the density of solid B.

9 (b) $\text{Average speed} = \frac{\text{distance}}{\text{time}}$

If the distance is halved and the time is doubled, what happens to the average speed?

Circle your answer.

[1 mark]

$\times 2$

$\times 4$

no change

$\div 2$

$\div 4$



10 Solve the simultaneous equations.

$$2x + y = 18$$

$$x - y = 6$$

[3 marks]

Answer _____

Turn over for the next question



11 Billy wants to buy these tickets for a show.

4 adult tickets at £15 each

2 child tickets at £10 each

A 10% booking fee is added to the ticket price.

3% is then added for paying by credit card.

Work out the **total** charge for these tickets when paying by credit card.

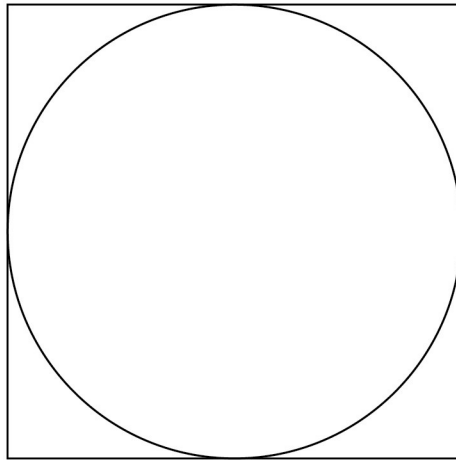
[5 marks]

Answer £ _____



12

Here is a circle touching a square.

Not drawn
accuratelyThe area of the square is 64 cm^2

Work out the area of the circle.

Give your answer in terms of π .**[3 marks]**

Answer _____ cm^2 **Turn over for the next question**

- 13** Write the number six million five thousand two hundred in standard form. **[2 marks]**

Answer _____

- 14** Solve $-3x > 6$ **[1 mark]**

Answer _____

- 15** $\frac{1}{6}$, $\frac{1}{7}$, $\frac{1}{8}$ and $\frac{1}{9}$ are four fractions.

How many of these fractions convert to a recurring decimal?

Circle your answer.

[1 mark]

0

1

2

3

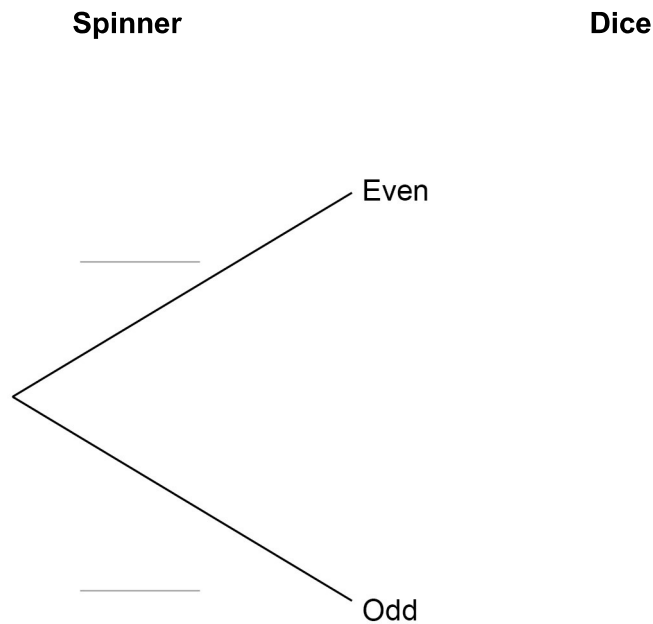
4



- 16** A fair spinner has five equal sections numbered 1, 2, 3, 4 and 5
 A fair six-sided dice has five red faces and one green face.
 The spinner is spun.
 If the spinner shows an even number, the dice is thrown.

- 16 (a)** Complete the tree diagram for the spinner and the dice.

[2 marks]



- 16 (b)** Work out the probability of getting an even number and the colour green.

[2 marks]

Answer _____



- 17** A is the point $(2, -5)$
 B is the point $(4, -9)$

- 17 (a)** Show that the gradient of the straight line passing through A and B is -2

[2 marks]

- 17 (b)** C is the point $(-301, 601)$

Does C lie on the straight line passing through A and B ?

You **must** show your working.

[2 marks]

Answer _____



7

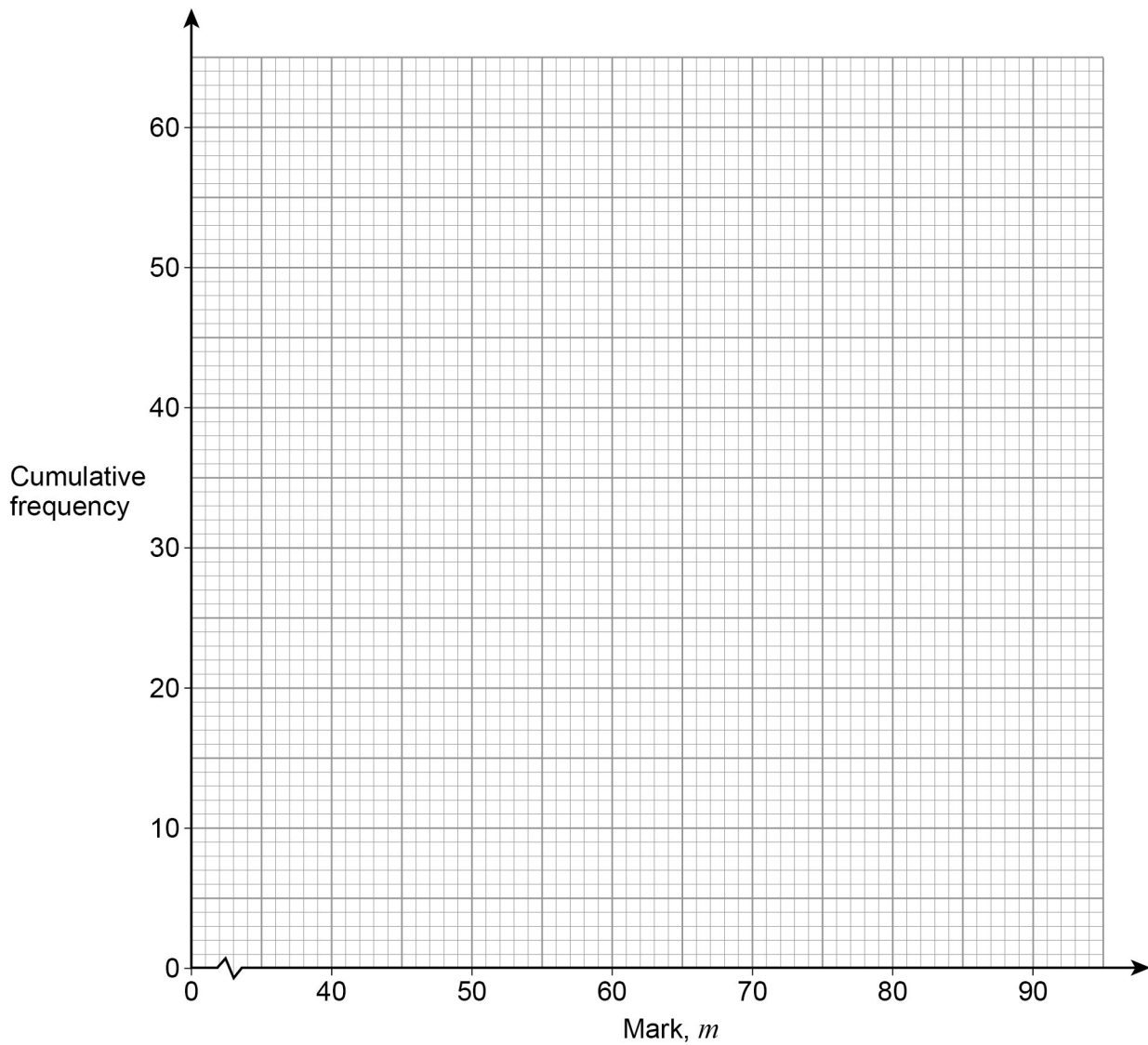


- 19** Here is some information about the marks of 60 students in a test.

Mark, m	Frequency		
$40 < m \leq 50$	9		
$50 < m \leq 60$	16		
$60 < m \leq 70$	20		
$70 < m \leq 80$	8		
$80 < m \leq 90$	7		

- 19 (a)** On the grid, draw a cumulative frequency graph.

[3 marks]



19 (b) Use your graph to estimate the lowest mark of the top 20% of students.

[2 marks]

Answer _____

20 Work out the diameter of the circle $x^2 + y^2 = 64$
Circle your answer.

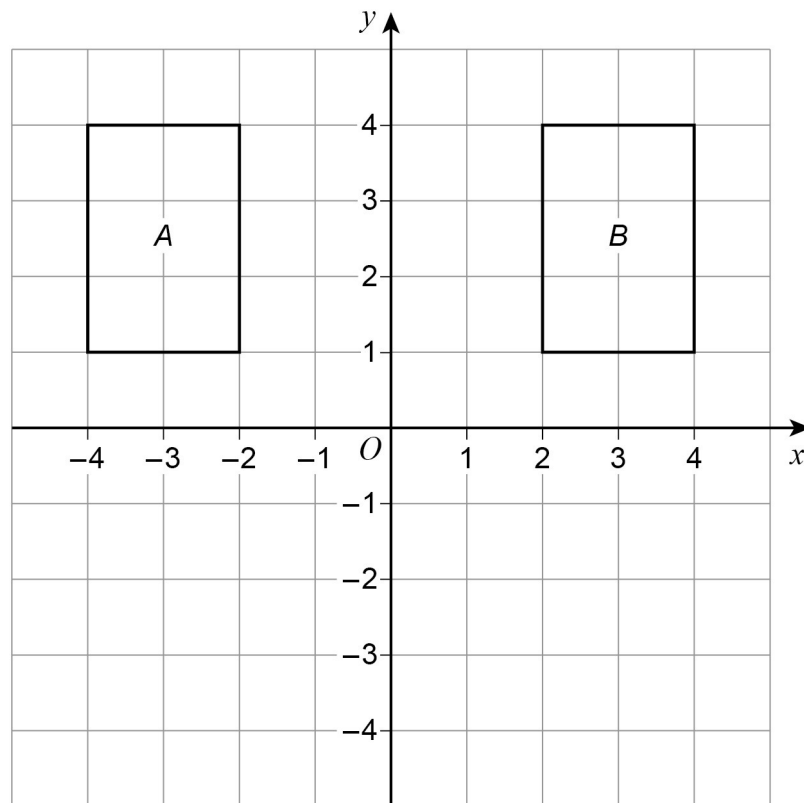
[1 mark]

8 16 32 128

Turn over for the next question



21 (a) The diagram shows rectangles A and B.



Rectangle A can be mapped to rectangle B by a **single** transformation.

Javed says,

“The **only** single transformation is a reflection in the y -axis because the rectangles are on opposite sides of the y -axis.”

Is he correct?

Tick a box.

Yes

☐

No

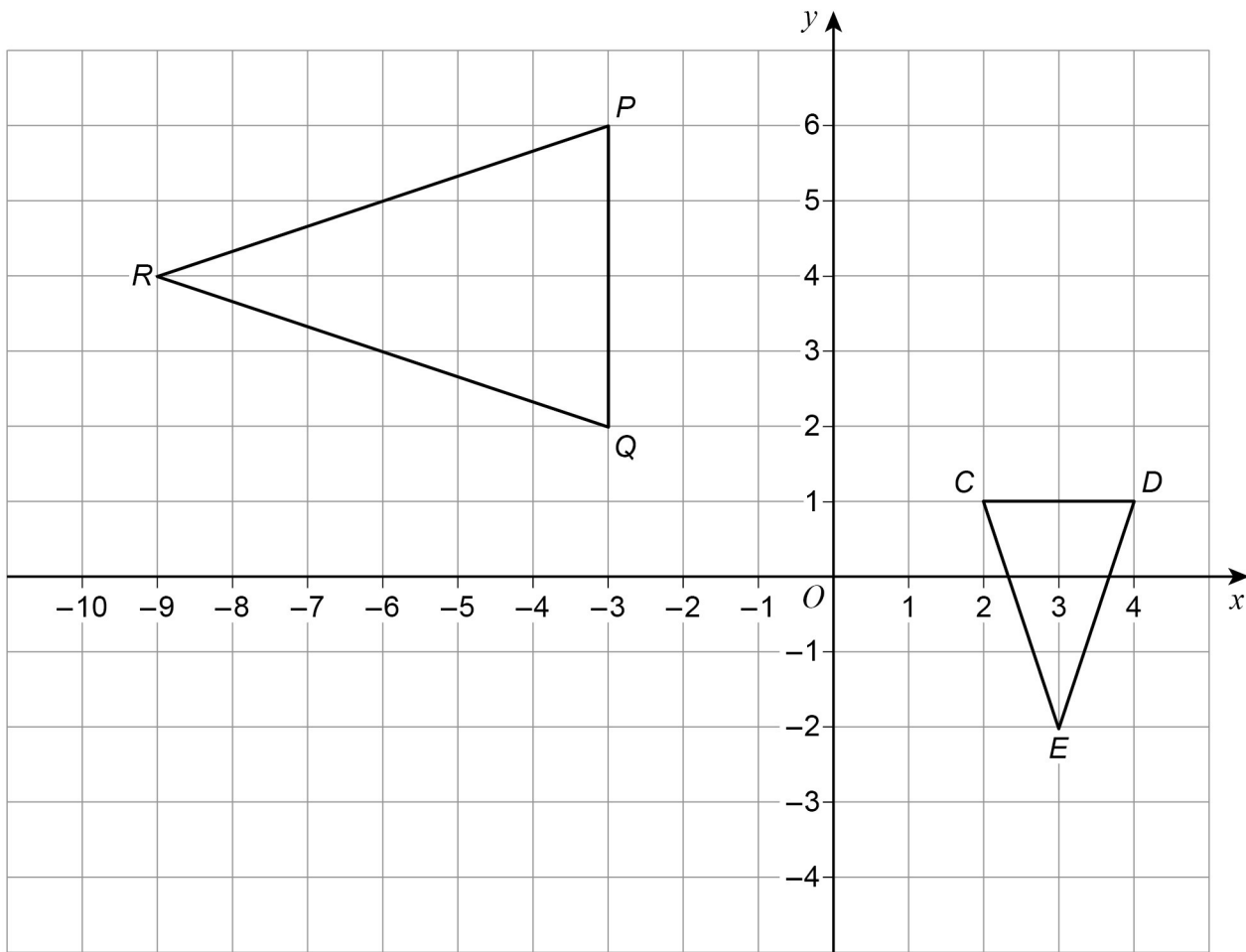
☐

Give a reason for your answer.

[1 mark]



21 (b) This diagram shows triangles CDE and PQR .



CDE is mapped to PQR by combining two single transformations.

The first is a rotation of 90° anticlockwise about E .

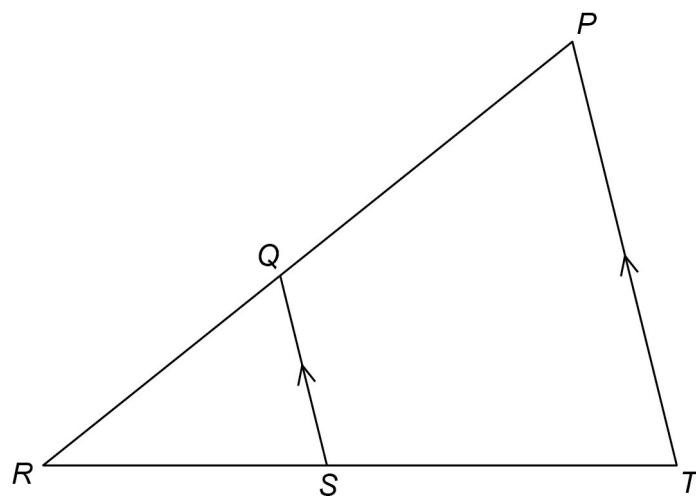
Describe fully the second transformation.

[3 marks]

Turn over for the next question



22 PRT and QRS are similar triangles.



Not drawn
accurately

Which of these is equivalent to $\frac{QR}{PR}$?

Circle your answer.

[1 mark]

$$\frac{RS}{ST}$$

$$\frac{QS}{PT}$$

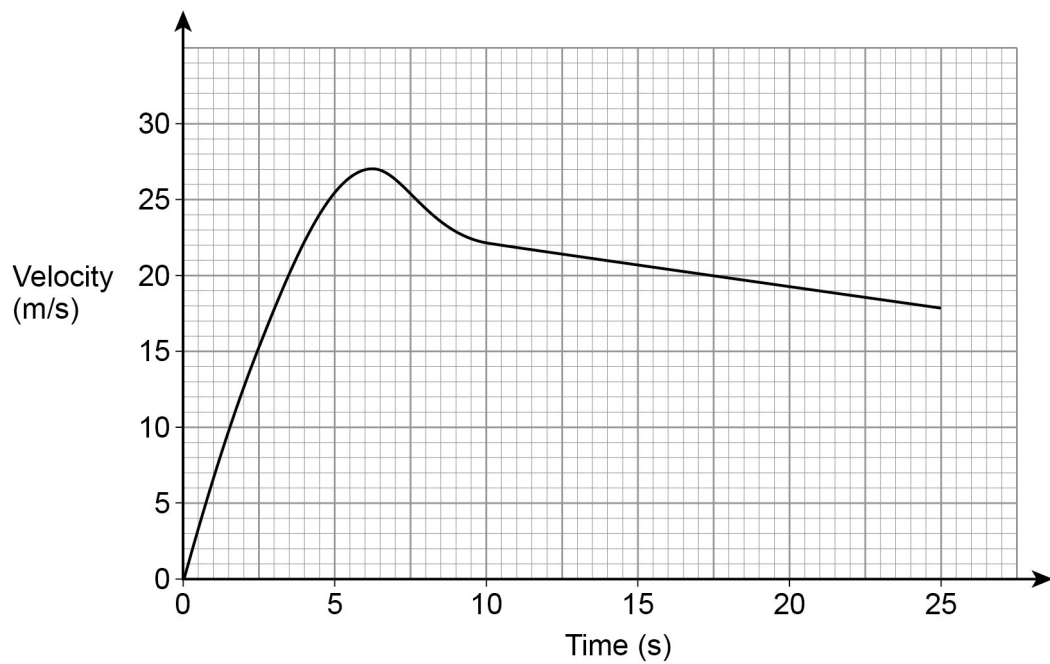
$$\frac{PT}{QS}$$

$$\frac{RT}{RS}$$



23

Here is a velocity-time graph of a motorbike for 25 seconds.

**23 (a)** After how many seconds was the acceleration zero?**[1 mark]**

Answer _____ seconds

23 (b) Work out the distance travelled in the last 15 seconds.**[2 marks]**

Answer _____ metres



24 (a) Work out $\sqrt{12\frac{1}{4}}$ as an improper fraction.

[1 mark]

Answer _____

24 (b) Work out $\sqrt[3]{16}$ as a power of 2

[2 marks]

Answer _____



[4 marks]

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Answer _____

Turn over for the next question



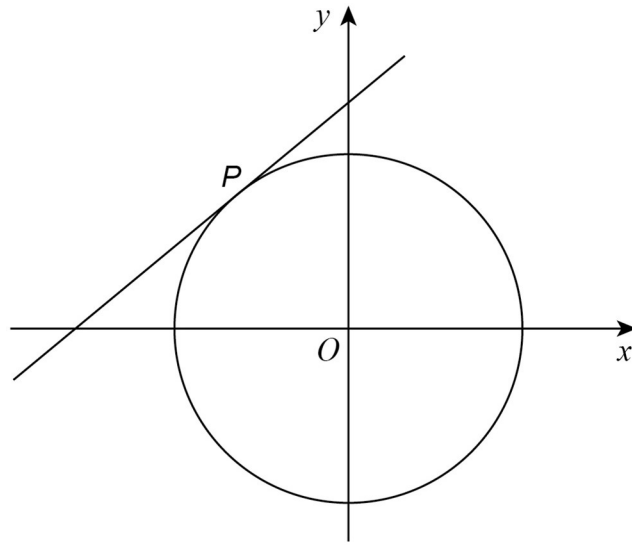
26

Expand and simplify $(x - 4)(2x + 3y)^2$ **[4 marks]**

Answer _____



27

 $P(-1, 4)$ is a point on a circle, centre O Not drawn
accuratelyWork out the equation of the tangent to the circle at P .Give your answer in the form $y = mx + c$ **[4 marks]**

Answer _____

Turn over ►



28

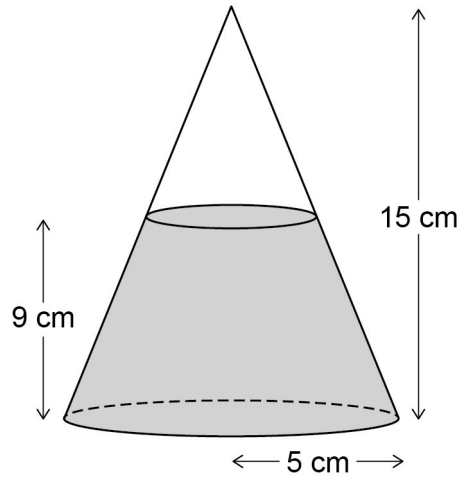
Volume of cone = $\frac{1}{3}\pi r^2 h$ where r is the radius and h is the perpendicular height.

A cone has a

horizontal base of radius 5 cm

height of 15 cm

The cone contains water to a depth of 9 cm



Work out the volume of the water, in cm^3

Give your answer in terms of π .

[4 marks]

Answer _____ cm^3



29 Simplify $\frac{2 \sin 45^\circ - \tan 45^\circ}{4 \tan 60^\circ}$

Give your answer in the form $\frac{\sqrt{a} - \sqrt{b}}{c}$ where a , b and c are integers.

[4 marks]

Answer _____

END OF QUESTIONS



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