A

Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

For Examiner's Use

Candidate Signature _____

GCSE MATHEMATICS

H

Higher Tier Paper 1 Non-calculator

8300/1H

Thursday 25 May 2017 Morning

Time allowed: 1 hour 30 minutes

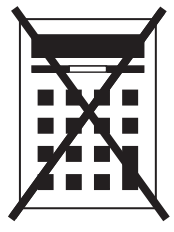
At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

JUN178300 1H01

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 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, tracing paper and graph paper. These must be tagged securely to this answer book.**

ADVICE

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

DO NOT TURN OVER UNTIL TOLD TO DO SO

Answer ALL questions in the spaces provided.

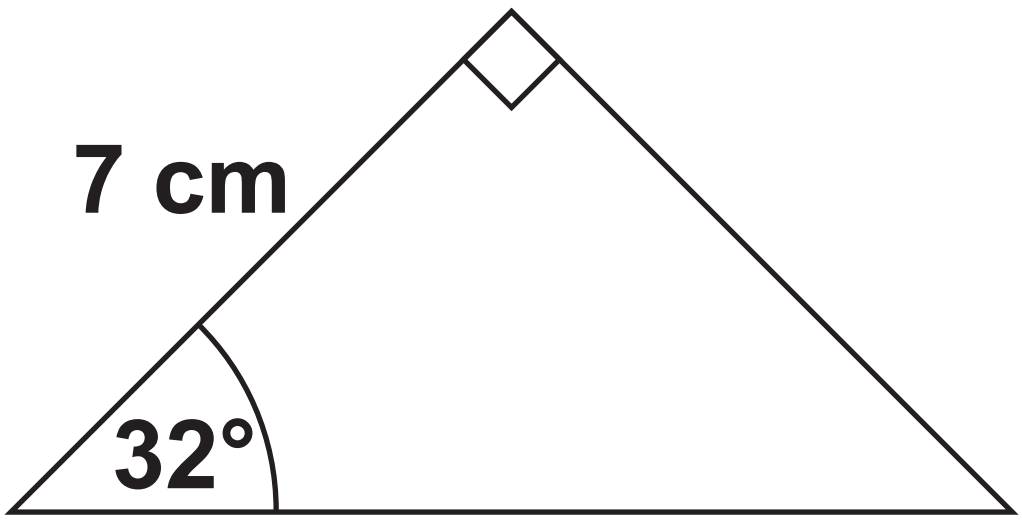
1 Simplify $2^5 \times 2^3$

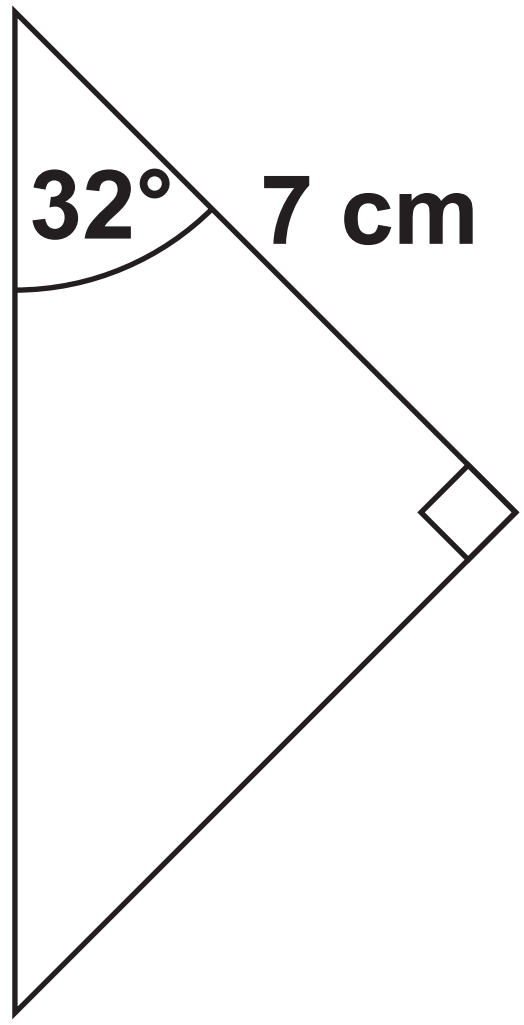
Circle your answer. [1 mark]

4^8 2^8 2^{15} 4^{15}

1

2 **Not drawn accurately**





Circle the reason why these triangles are congruent.
[1 mark]

SSS **SAS** **ASA** **RHS**

1

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

1

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

1

5 **Write 36 as a product of prime factors.**

Give your answer in index form.
[3 marks]

Answer _____

3

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

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

4

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

Work out the number.
[2 marks]

Answer

2

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 _____

2

[Turn over]

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]

× 2 × 4 no change

÷ 2 ÷ 4

2

[Turn over]

10 **Solve the simultaneous equations.**

$$2x + y = 18$$

$$x - y = 6$$

[3 marks]

Answer _____

3

[Turn over]

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.

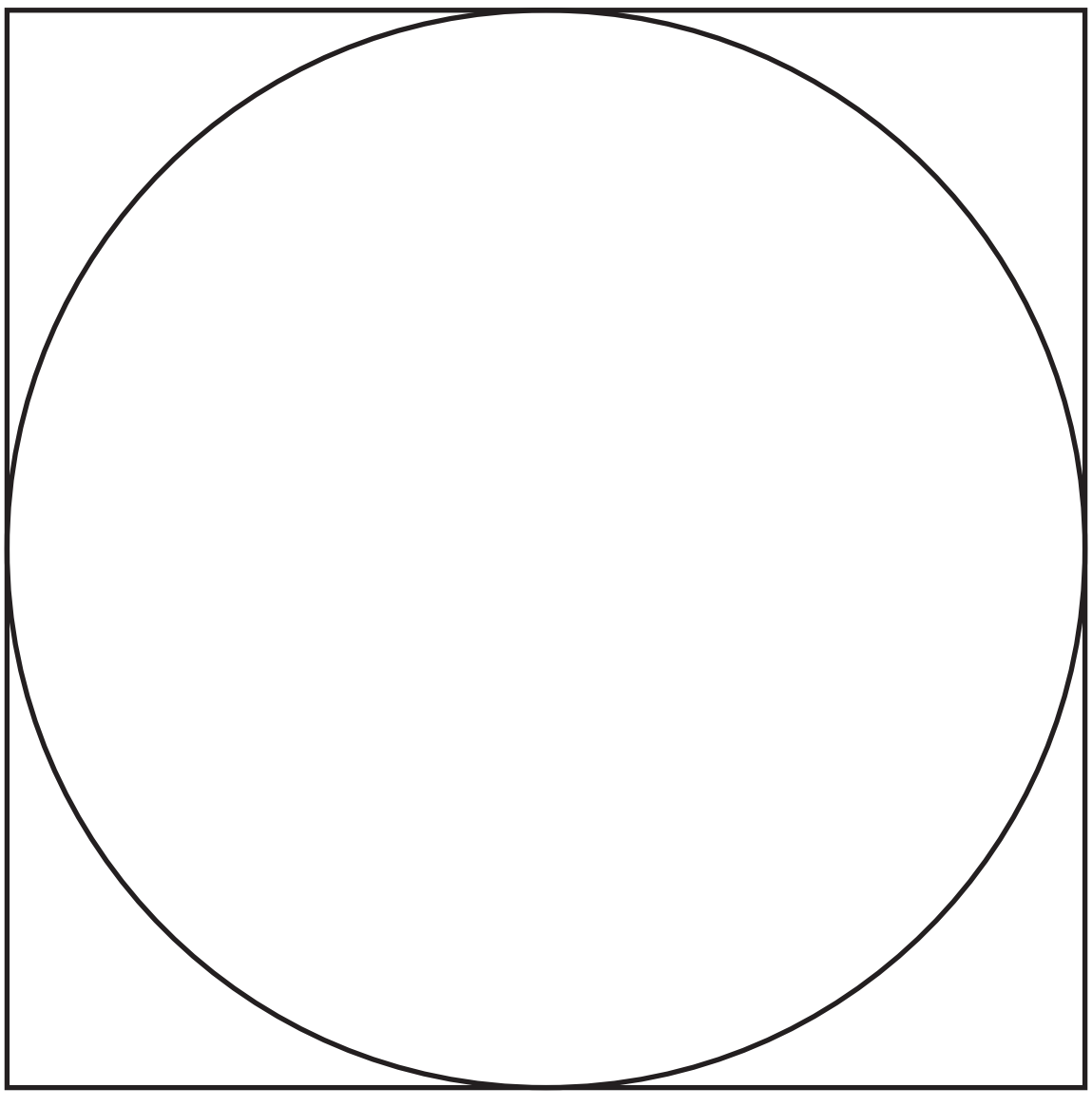
Work out the TOTAL charge for these tickets when paying by credit card. [5 marks]

Answer £ _____

[Turn over]

12 Here is a circle touching a square.

Not drawn accurately



The 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

3

13 Write the number

six million five thousand two hundred in standard form.
[2 marks]

Answer

2

14 Solve $-3x > 6$

[1 mark]

Answer _____

1

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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

1

16 A fair spinner has five equal sections numbered 1, 2, 3, 4 and 5

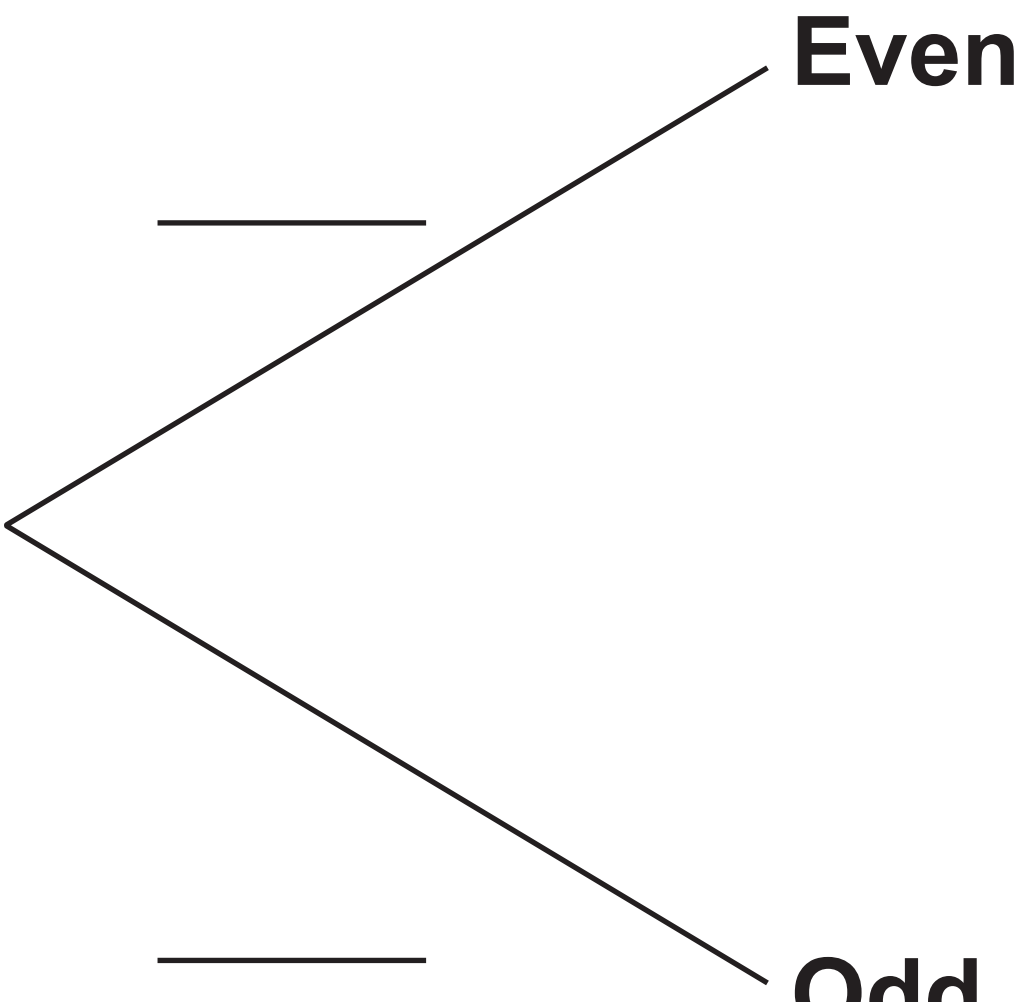
A fair six-sided dice has five red faces and one green face.

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]

SPINNER DICE



[Turn over]

16 (b) Work out the probability of getting an even number and the colour green. [2 marks]

Answer

4

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

4

[Turn over]

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18 **Bottles of drink are for sale at three shops.**

The normal price of a bottle is the same at each shop.

SHOP A

Buy 1 bottle

Get 2 more bottles at half price

SHOP B

Buy 2 bottles

Get 3 more bottles at half price

SHOP C

30% off a bottle

[Turn over]

What is the cheapest way to buy EXACTLY 8 bottles?

You can buy from more than one shop.

You MUST show your working.
[3 marks]

33

Answer

3

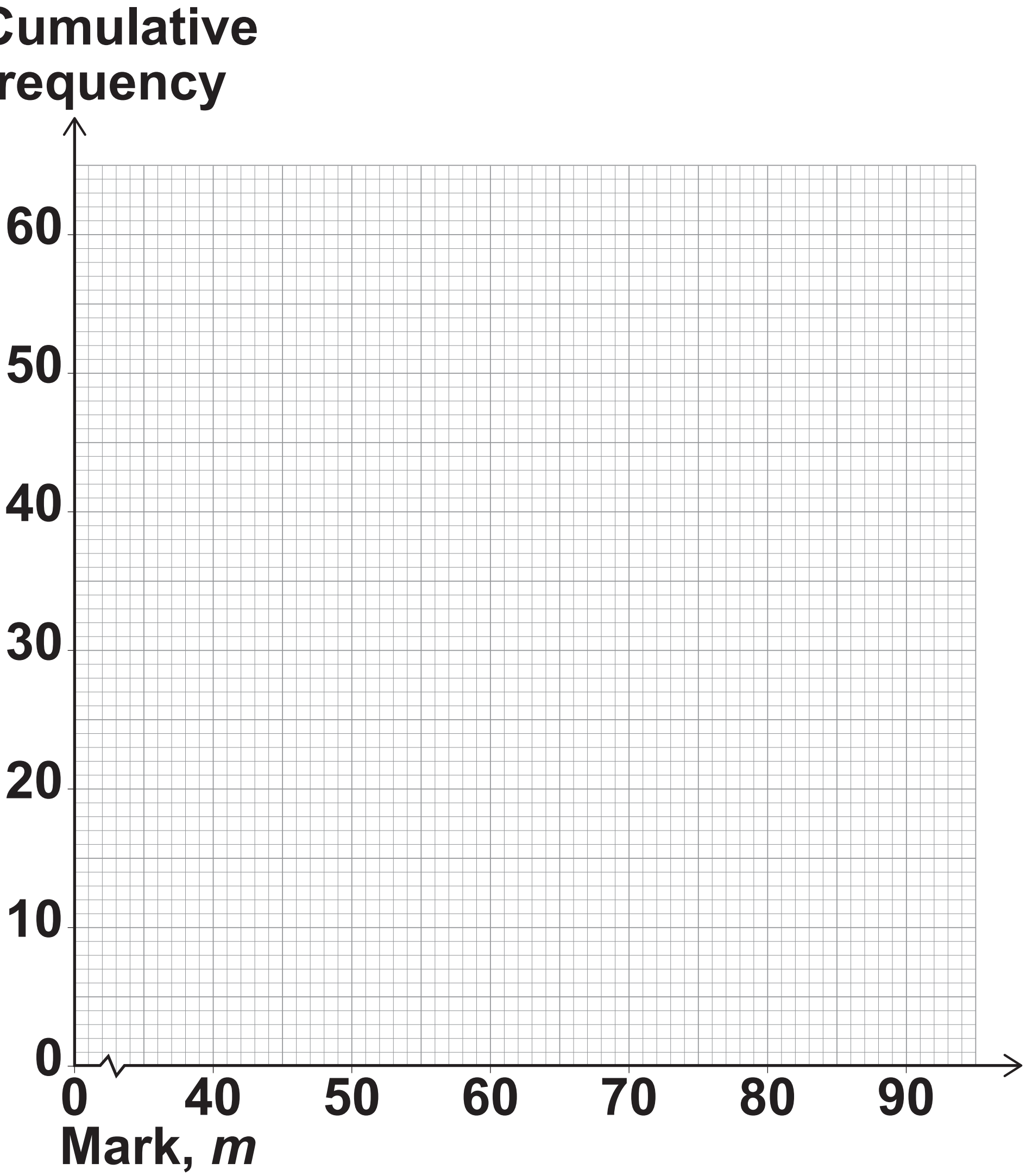
[Turn over]

3 3

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

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

19 (a) On the grid, draw a cumulative frequency graph. [3 marks]



[Turn over]

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19 (b) Use your graph to estimate the lowest mark of the top 20% of students. [2 marks]

Answer _____

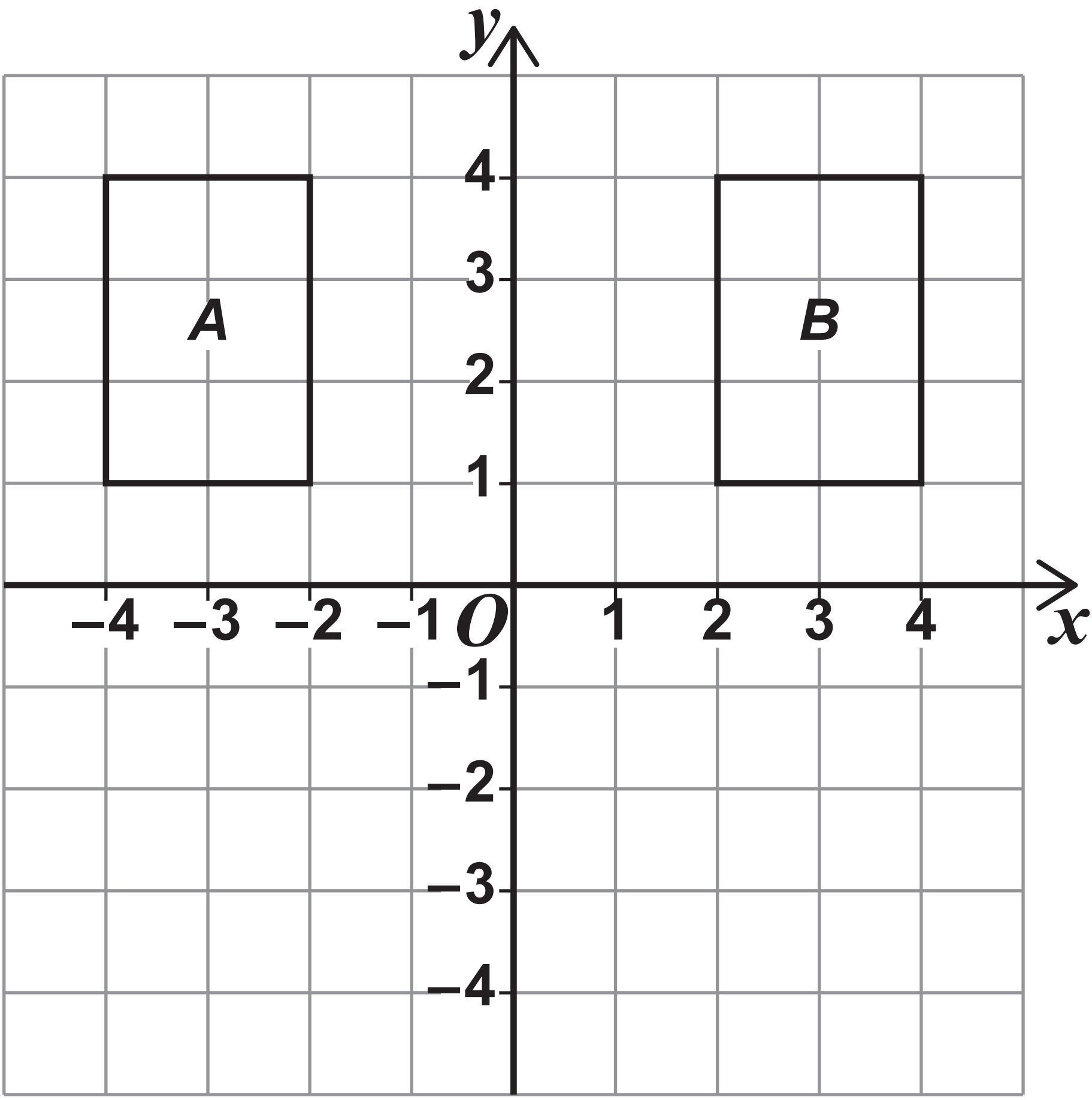
20 Work out the diameter of the circle $x^2 + y^2 = 64$

Circle your answer. [1 mark]

8 16 32 128

6

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

[Turn over]

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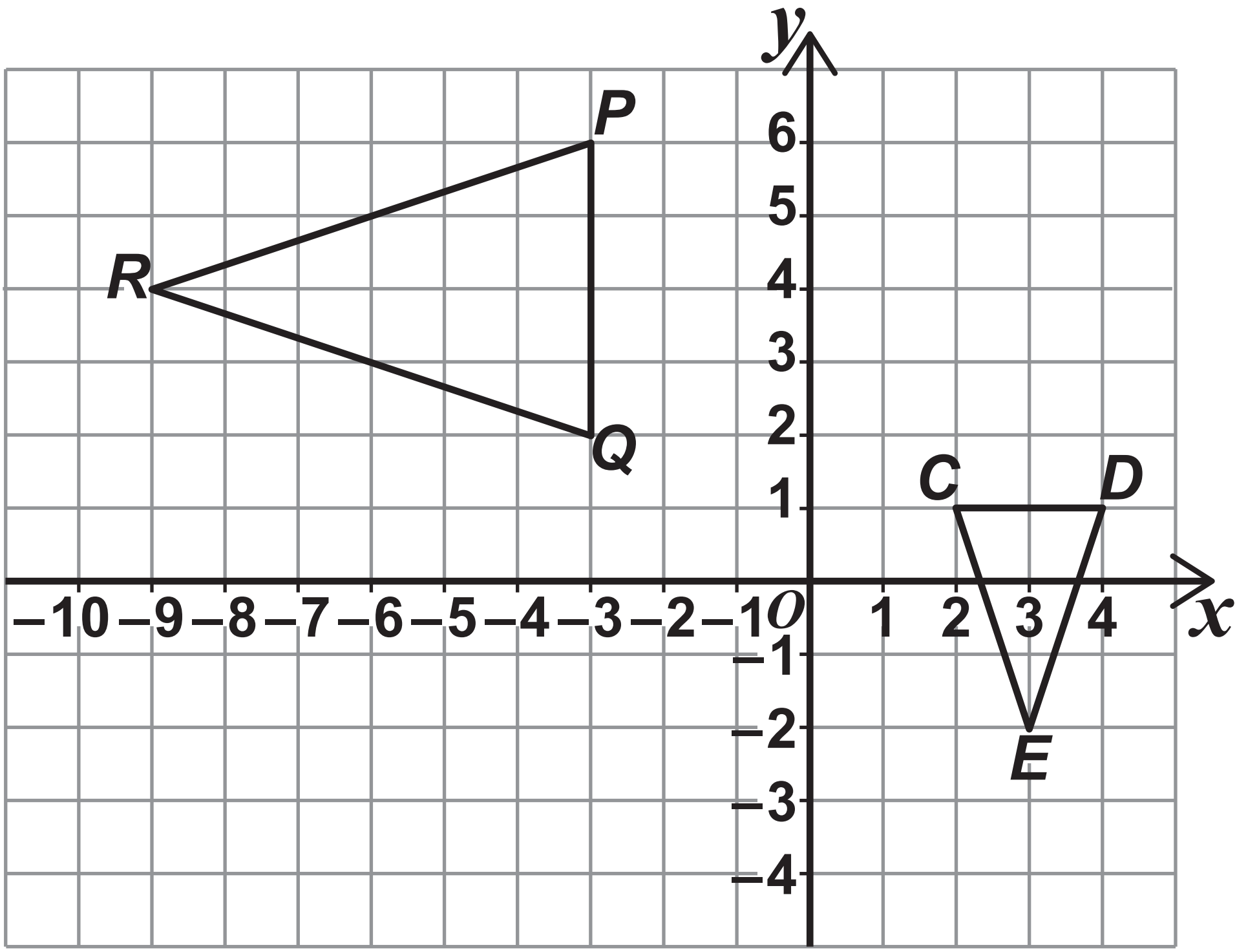
Give a reason for your answer.
[1 mark]

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



CDE **is mapped to** ***PQR*** **by combining two single transformations.**

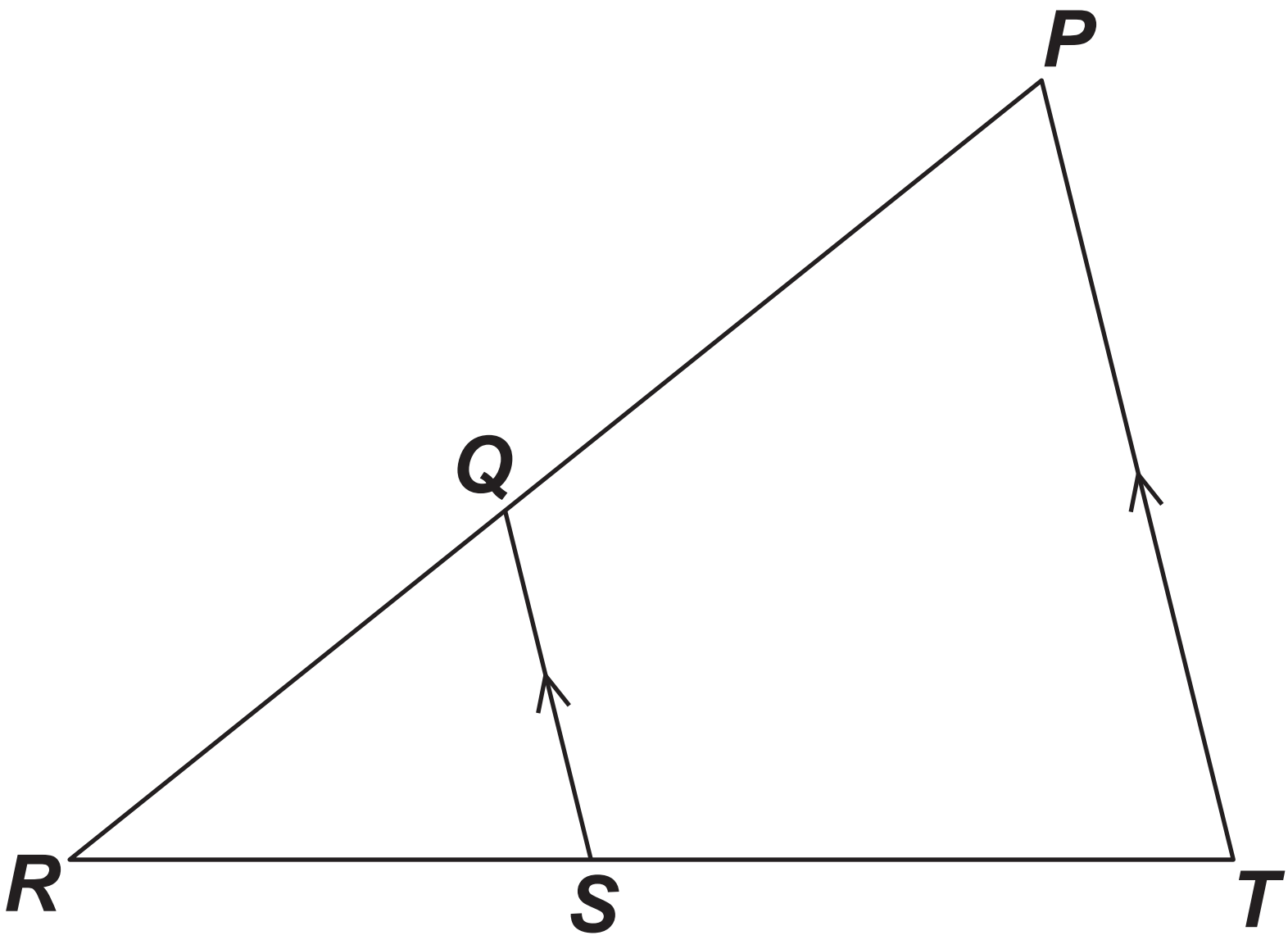
The first is a rotation of 90º anticlockwise about ***E*****.**

Describe fully the second transformation. [3 marks]

4

22 *PRT* and *QRS* are similar triangles.

Not drawn accurately



Which of these is equivalent to

$\frac{QR}{PR}$**?**

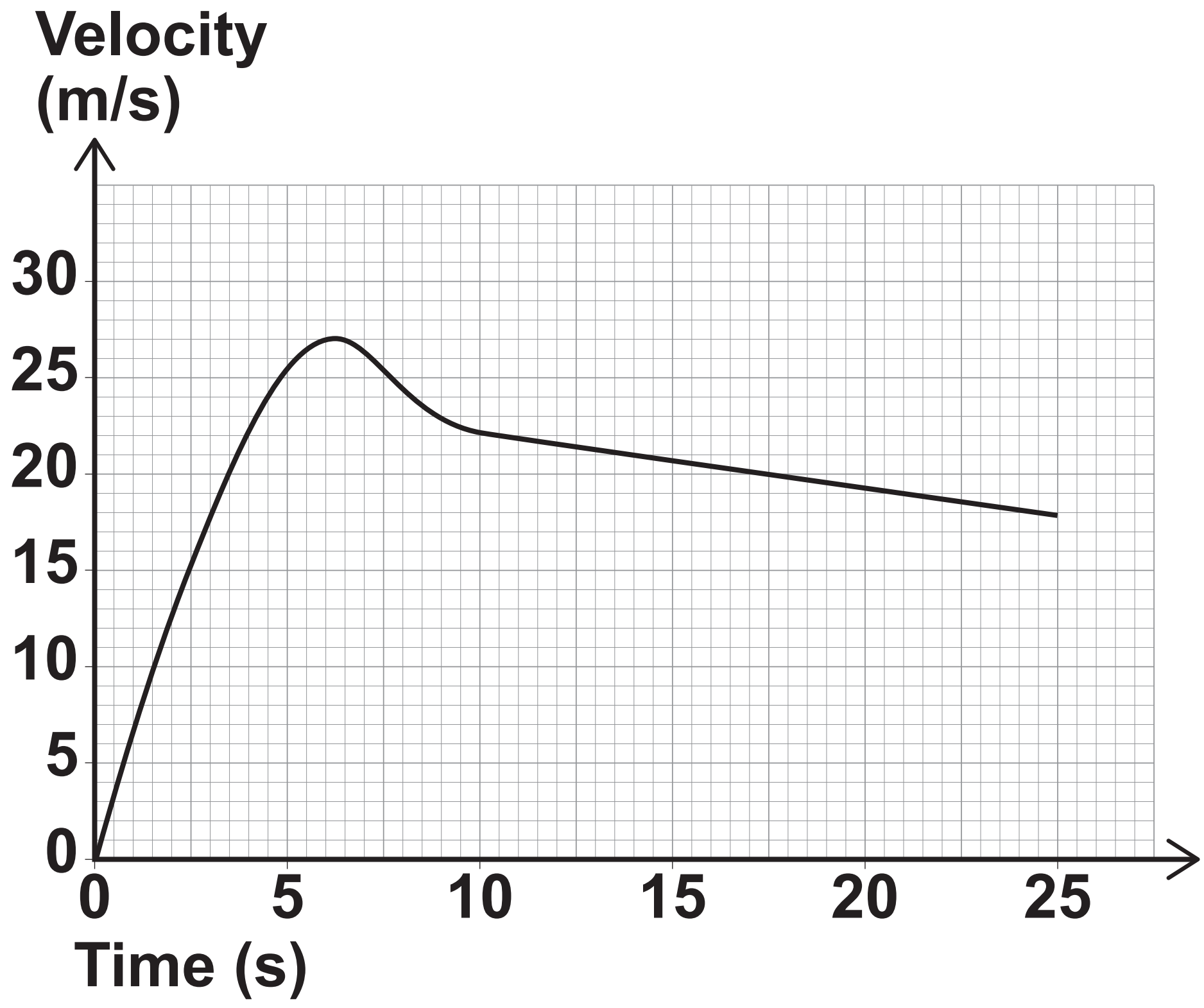
Circle your answer. [1 mark]

$\frac{RS}{ST}$ $\frac{QS}{PT}$

$\frac{PT}{QS}$ $\frac{RT}{RS}$

1

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

3

[Turn over]

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

3

[Turn over]

25 In an office there are twice as many females as males.

$\frac{1}{4}$ of the females wear glasses.

$\frac{3}{8}$ of the males wear glasses.

84 people in the office wear glasses.

Work out the number of people in the office. [4 marks]

[Turn over]

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Answer _____

4

[Turn over]

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

55

Answer

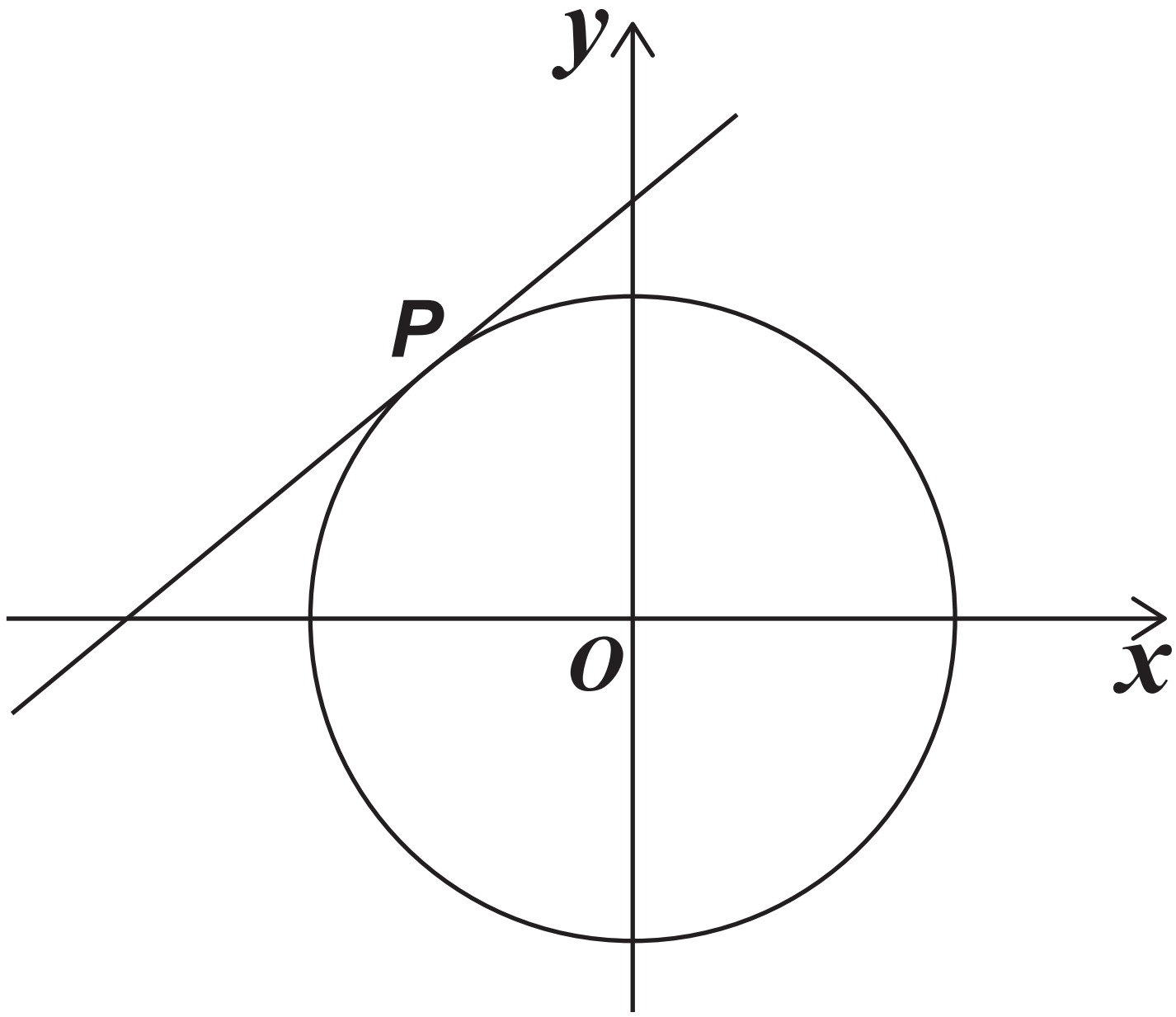
4

[Turn over]

5 5

27 *P* (–1, 4) is a point on a circle, centre O

Not drawn accurately



Work out the equation of the tangent to the circle at *P*.

Give your answer in the form
$y = mx + c$
[4 marks]

Answer

4

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

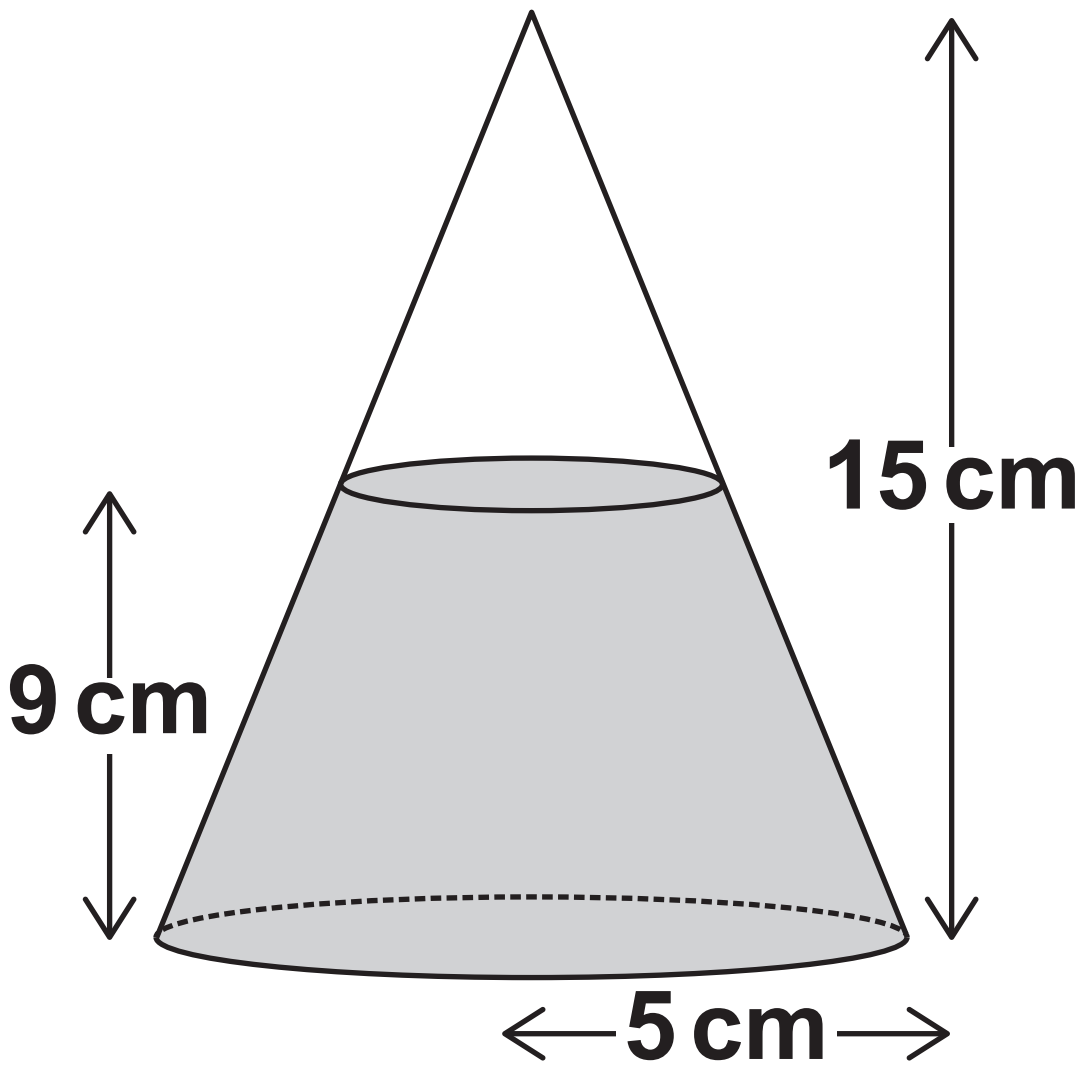
where r is the radius and
h is the perpendicular height.

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]

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Answer _____ cm^3

[Turn over]

29 Simplify $\dfrac{2 \sin 45° - \tan 45°}{4 \tan 60°}$

Give your answer in the form $\dfrac{\sqrt{a} - \sqrt{b}}{c}$

where a, b and c are integers.
[4 marks]

Answer _____

4

END OF QUESTIONS

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For Examiner's Use			
Examiner's Initials			
Question	Mark	Question	Mark
1		16	
2		17	
3		18	
4		19	
5		20	
6		21	
7		22	
8		23	
9		24	
10		25	
11		26	
12		27	
13		28	
14		29	
15			
TOTAL		TOTAL	
	TOTAL		