

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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# GCSE MATHEMATICS

Past Paper  
Website  
Home



# H

Higher Tier

Paper 1 Non-Calculator

Thursday 25 May 2017

Morning

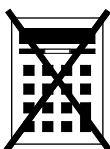
Time allowed: 1 hour 30 minutes

## 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.

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	
<b>TOTAL</b>	

## Advice

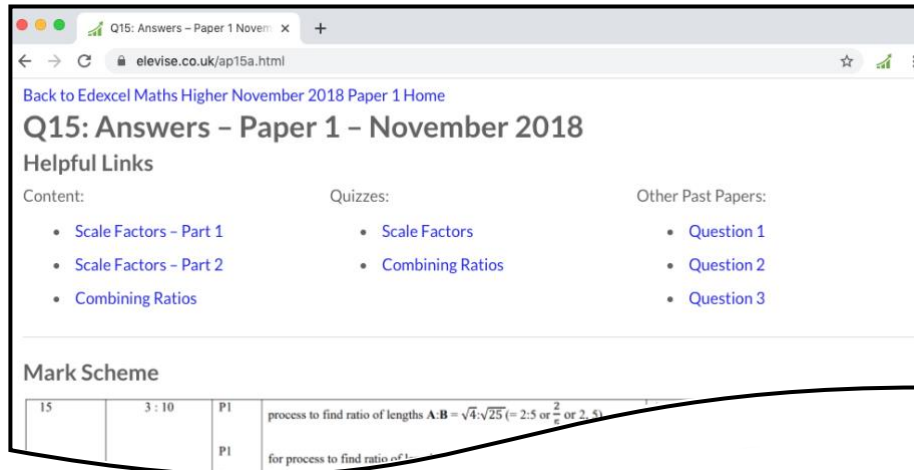
- In all calculations, show clearly how you work out your answer.



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

## How the Past Papers work

Every past paper question has a corresponding webpage that has the mark scheme and worked solutions for that particular question. There are also helpful links to content for the concepts used to answer the question, quizzes that you can use to try some of the concepts and similar past paper questions. An example of a webpage for a question is given below:



Q15: Answers - Paper 1 - November 2018

Helpful Links

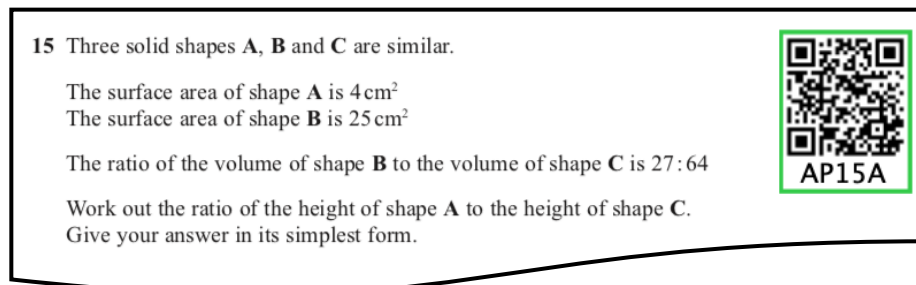
Content:	Quizzes:	Other Past Papers:
<ul style="list-style-type: none"><li>Scale Factors - Part 1</li><li>Scale Factors - Part 2</li><li>Combining Ratios</li></ul>	<ul style="list-style-type: none"><li>Scale Factors</li><li>Combining Ratios</li></ul>	<ul style="list-style-type: none"><li>Question 1</li><li>Question 2</li><li>Question 3</li></ul>

Mark Scheme

Q	Content	Mark	Process
15	3 : 10	P1	process to find ratio of lengths A:B = $\sqrt{4 \cdot \sqrt{25}} = 2.5$ or $\frac{2}{5}$
		P1	for process to find ratio of 1

## How to get to the webpage

Every past paper question has a QR code next to it, such as:




15 Three solid shapes A, B and C are similar.

The surface area of shape A is  $4 \text{ cm}^2$   
The surface area of shape B is  $25 \text{ cm}^2$

The ratio of the volume of shape B to the volume of shape C is 27 : 64

Work out the ratio of the height of shape A to the height of shape C.  
Give your answer in its simplest form.



AP15A

You can get to the corresponding webpage in 3 different ways:

- 1) Scanning the QR code with the camera on a smart phone or tablet.
- 2) Typing the code that is underneath the QR code at the end of [www.elewise.co.uk/](http://www.elewise.co.uk/). For this question, the code is AP15A, so you would type [www.elewise.co.uk/AP15A](http://www.elewise.co.uk/AP15A) into the address bar to obtain the webpage. If you would like to see the question rather than the answers, you change the A at the end of the code to a Q; you would type [www.elewise.co.uk/AP15Q](http://www.elewise.co.uk/AP15Q)
- 3) Clicking on the QR code if you are viewing the past paper as a PDF or on a web browser.

[www.elewise.co.uk](http://www.elewise.co.uk)



Answer **all** questions in the spaces provided

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

$4^8$

$2^8$

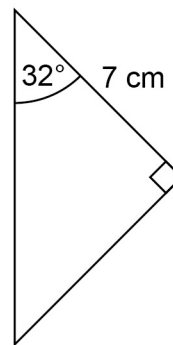
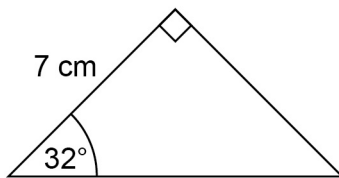
$2^{15}$

$4^{15}$

[1 mark]



2

Not drawn  
accurately

Circle the reason why these triangles are congruent.

SSS

SAS

ASA

RHS

[1 mark]



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

2, 4, 6, 8, 10

2, 3, 5, 8, 12

2, 6, 18, 54, 162

2, 6, 10, 14, 18

[1 mark]



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	<input type="checkbox"/>	<input type="checkbox"/>
The mean could be more than 40 minutes	<input type="checkbox"/>	<input type="checkbox"/>
The mean could be less than 40 minutes	<input type="checkbox"/>	<input type="checkbox"/>
The range could be more than 40 minutes	<input type="checkbox"/>	<input type="checkbox"/>
The range could be less than 40 minutes	<input type="checkbox"/>	<input type="checkbox"/>
The range could be more than 60 minutes	<input type="checkbox"/>	<input type="checkbox"/>



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

Work out the number.

[2 marks]



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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]



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Answer \_\_\_\_\_

**Turn over for the next question**



9 (a) 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) 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]

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Answer \_\_\_\_\_

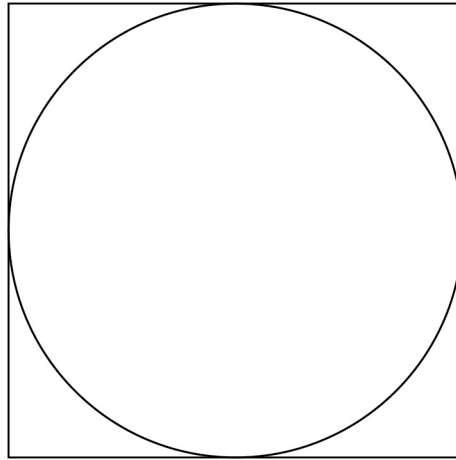
**Turn over for the next question**







12 Here is a circle touching a square.



Not drawn  
accurately

The area of the square is  $64 \text{ cm}^2$

Work out the area of the circle.

Give your answer in terms of  $\pi$ .



[3 marks]

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Answer \_\_\_\_\_  $\text{cm}^2$

**Turn over for the next question**



- 13 Write the number six million five thousand two hundred in standard form.

[2 marks]

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AJ13A

Answer \_\_\_\_\_

- 14 Solve  $-3x > 6$

[1 mark]

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AJ14A

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

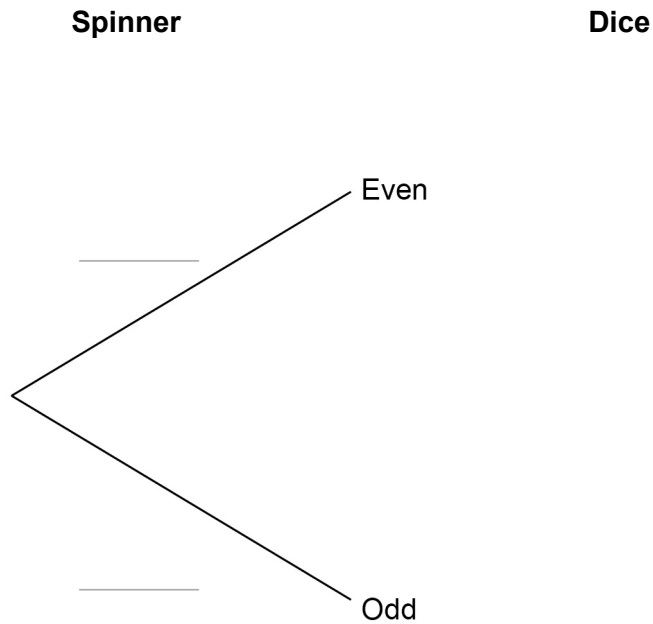




- 16** A fair spinner has five equal sections numbered 1, 2, 3, 4 and 5  
A fair six-sided dice has five red faces and one green face.  
The spinner is spun.  
If the spinner shows an even number, the dice is thrown.

- 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]

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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]



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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]

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Answer \_\_\_\_\_



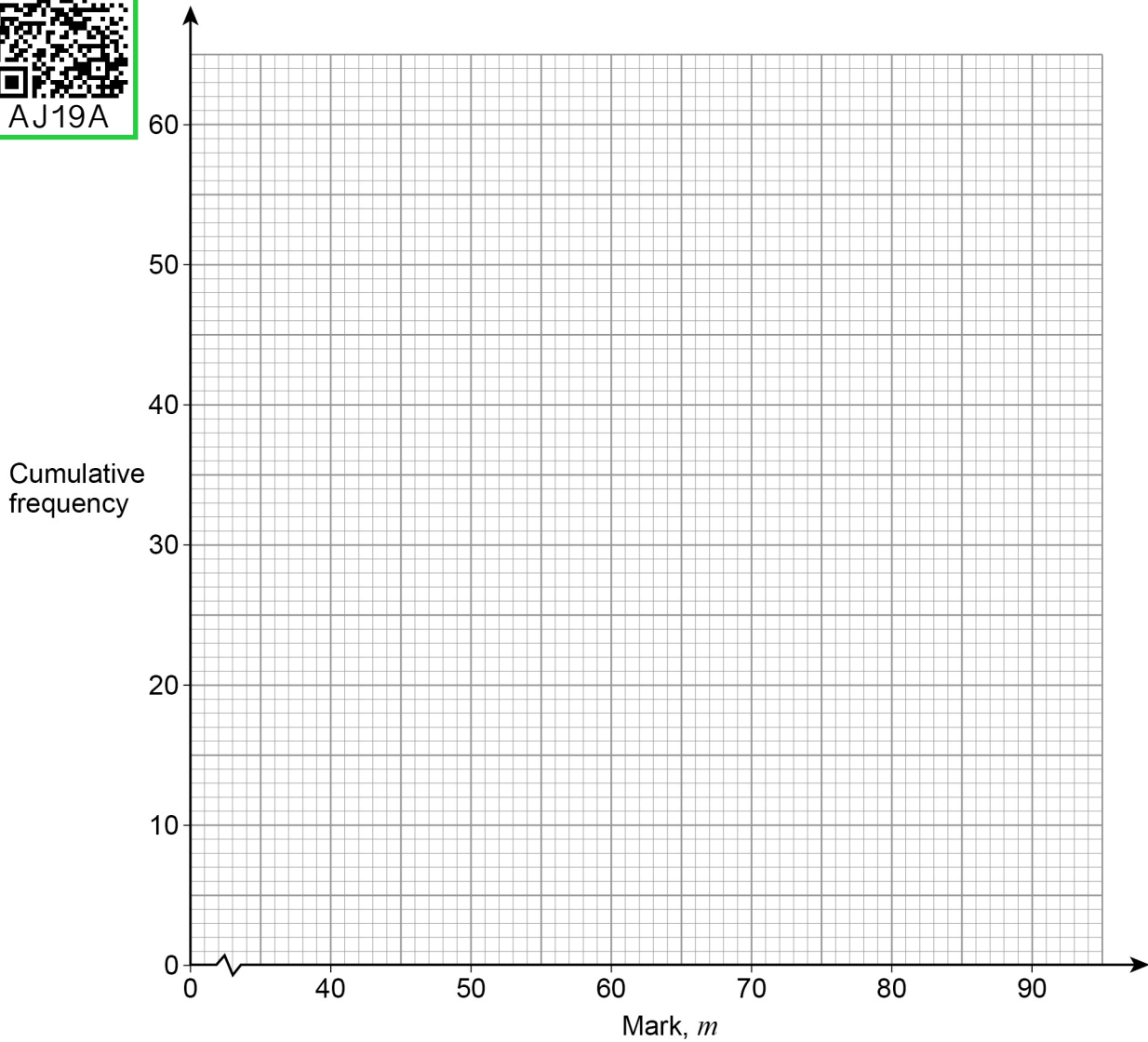


19 Here is some information about the marks of 60 students in a test.

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]

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Answer \_\_\_\_\_

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

[1 mark]

8                  16                  32                  128

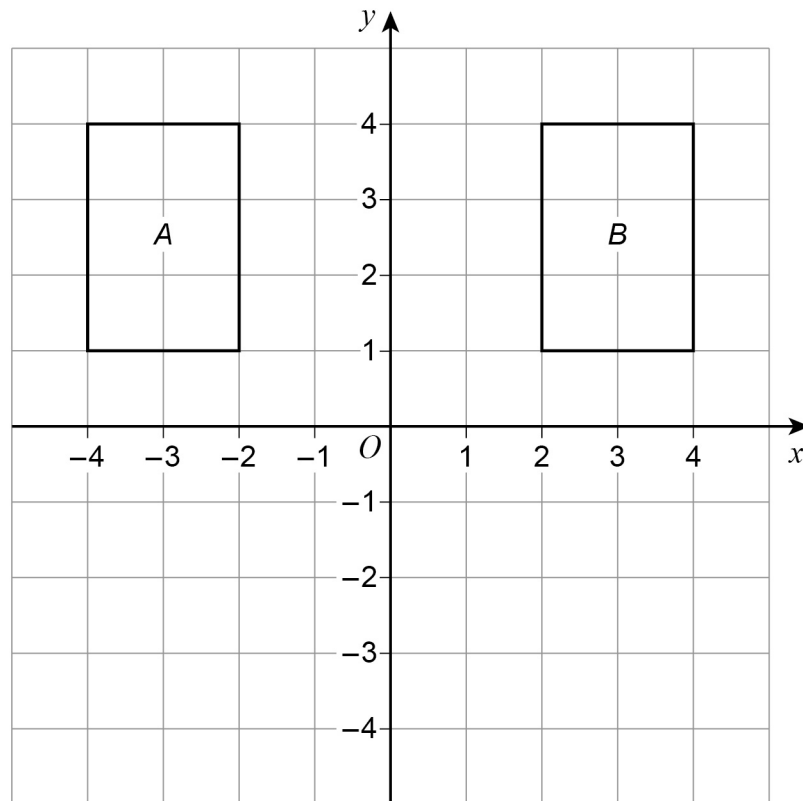


**Turn over for the next question**





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



AJ21A

[1 mark]

Give a reason for your answer.

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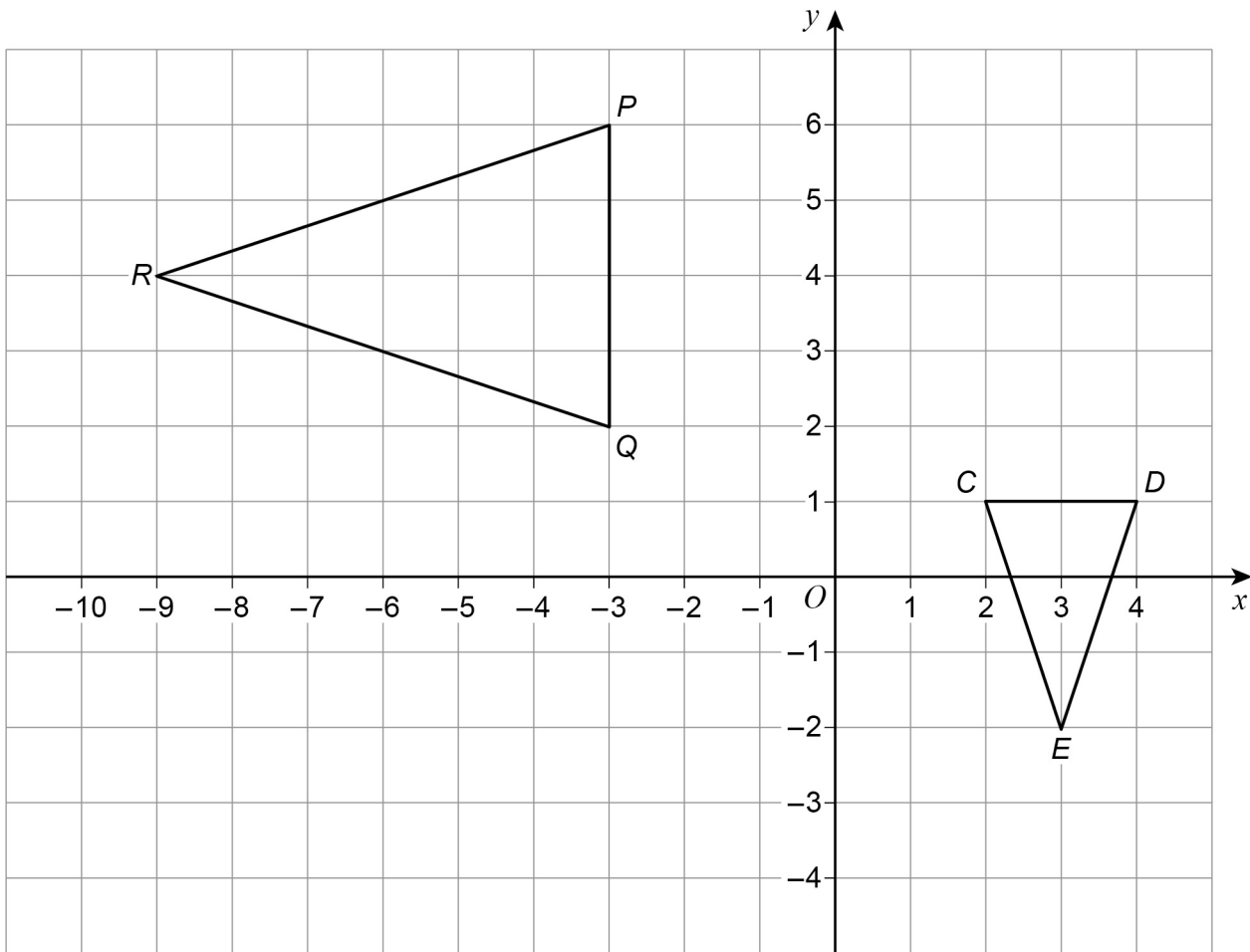
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21 (b) This diagram shows triangles  $CDE$  and  $PQR$ .



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

The first is a rotation of  $90^\circ$  anticlockwise about  $E$ .

Describe fully the second transformation.

[3 marks]

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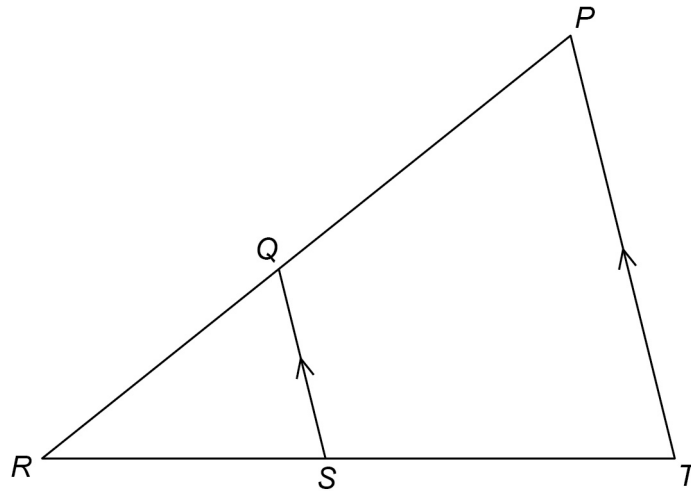
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Turn over for the next question

Turn over ►



22

 $PRT$  and  $QRS$  are similar triangles.Not drawn  
accuratelyWhich of these is equivalent to  $\frac{QR}{PR}$ ?

Circle your answer.

[1 mark]

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

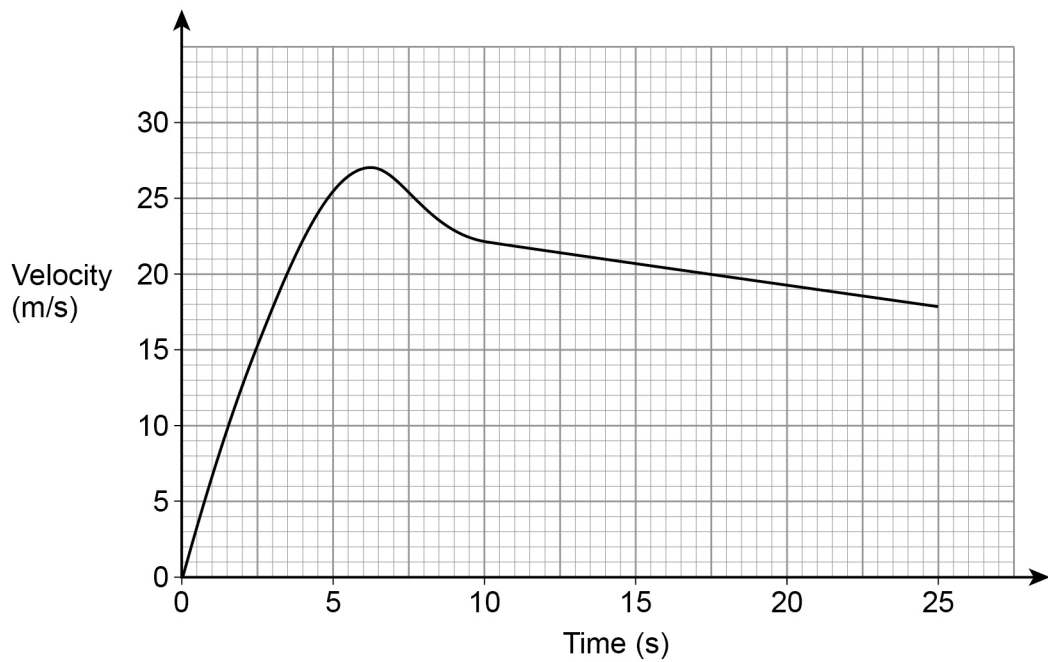
$$\frac{QS}{PT}$$

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

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



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]

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Answer \_\_\_\_\_ metres



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

[1 mark]



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Answer \_\_\_\_\_

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

[2 marks]

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Answer \_\_\_\_\_





**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]**

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Answer \_\_\_\_\_

**Turn over for the next question**

      
**7**

**Turn over ►**



26

Expand and simplify  $(x - 4)(2x + 3y)^2$ 

[4 marks]




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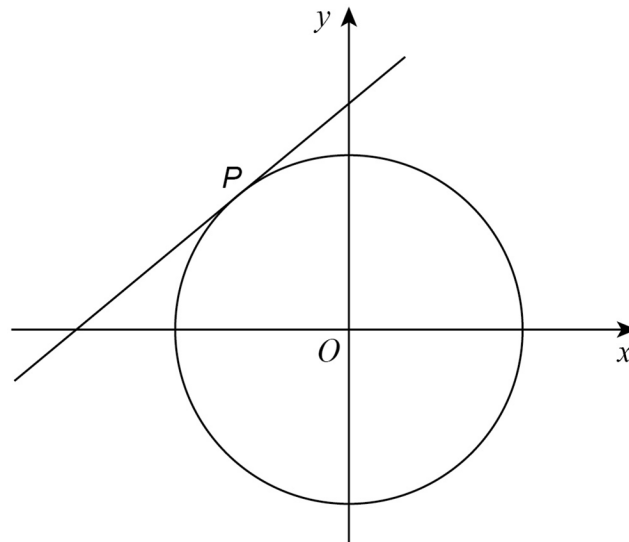


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Answer \_\_\_\_\_



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]**

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Answer \_\_\_\_\_

8

Turn over ►







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]**

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Answer \_\_\_\_\_

**END OF QUESTIONS**