

## GCSE (9–1) Mathematics

### J560/06 Paper 6 (Higher Tier)

#### Practice Paper

## Date – Morning/Afternoon

Time allowed: 1 hour 30 minutes



**You may use:**

- A scientific or graphical calculator
- Geometrical instruments
- Tracing paper



First name

Last name

Centre  
number

Candidate  
number

### INSTRUCTIONS

- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

### INFORMATION

- The total mark for this paper is **100**.
- The marks for each question are shown in brackets [ ].
- Use the  $\pi$  button on your calculator or take  $\pi$  to be 3.142 unless the question says otherwise.
- This document consists of **16** pages.

Answer **all** the questions

- 1 A bakery bakes small, medium and large pies.  
The ratio small : medium : large is 3 : 5 : 2.

(a) What fraction of the pies are large?

(a) ..... [1]

(b) One day 460 medium pies are baked.

Work out how many small pies are baked.

(b) ..... [2]

- 2 A triangle has sides of length 23.8 cm, 31.2 cm and 39.6 cm.

Is this a right-angled triangle?  
Show how you decide.

.....  
..... [4]

3 (a) Solve.

$$4x - 7 = 8 - 2x$$

(a)  $x = \dots\dots\dots$  [3]

(b) Solve this inequality.

$$5x + 9 > 13$$

(b)  $\dots\dots\dots$  [2]

(c) Rearrange this formula to make  $x$  the subject.

$$y = \sqrt{4x - 3}$$

(c)  $\dots\dots\dots$  [3]

4 John is going to drive from Cambridge to Newcastle.



- (a) John needs to be in Newcastle at 11 am.  
He drives at an average speed of 60 miles per hour.

What time does he need to leave Cambridge?

(a) ..... [5]

(b) State one assumption you have made.  
Explain how this has affected your answer to part (a).

.....  
.....  
.....  
..... [2]

5 When water freezes into ice its volume increases by 9%.

What volume of water freezes to make  $1962 \text{ cm}^3$  of ice?

.....  $\text{cm}^3$  [3]

- 6 The table shows data for the UK about its population and the total amount of money spent on healthcare in 2002, 2007 and 2012.

Year	Population	Total spent on healthcare (£)
2002	$5.94 \times 10^7$	$8.14 \times 10^{10}$
2007	$6.13 \times 10^7$	$1.20 \times 10^{11}$
2012	$6.37 \times 10^7$	$1.45 \times 10^{11}$

- (a) How much more was spent on healthcare in 2007 than in 2002?  
Give your answer in millions of pounds.

(a) £ ..... million [3]

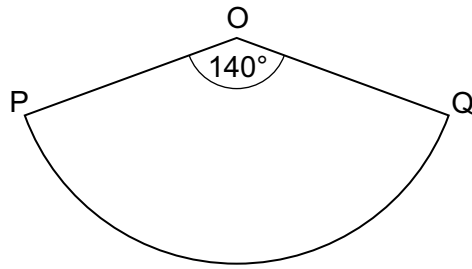
- (b) Marcia says

The amount spent on healthcare **per person** in the UK doubled in 10 years.

Use the information in the table to comment on whether Marcia is correct.

.....  
..... [4]

- 7 OPQ is a sector of a circle, centre O and radius 9 cm.



Not to scale

Find the perimeter of the sector.  
Give your answer in terms of  $\pi$ .

..... cm [3]

- 8 (a) Write down the reciprocal of 8.

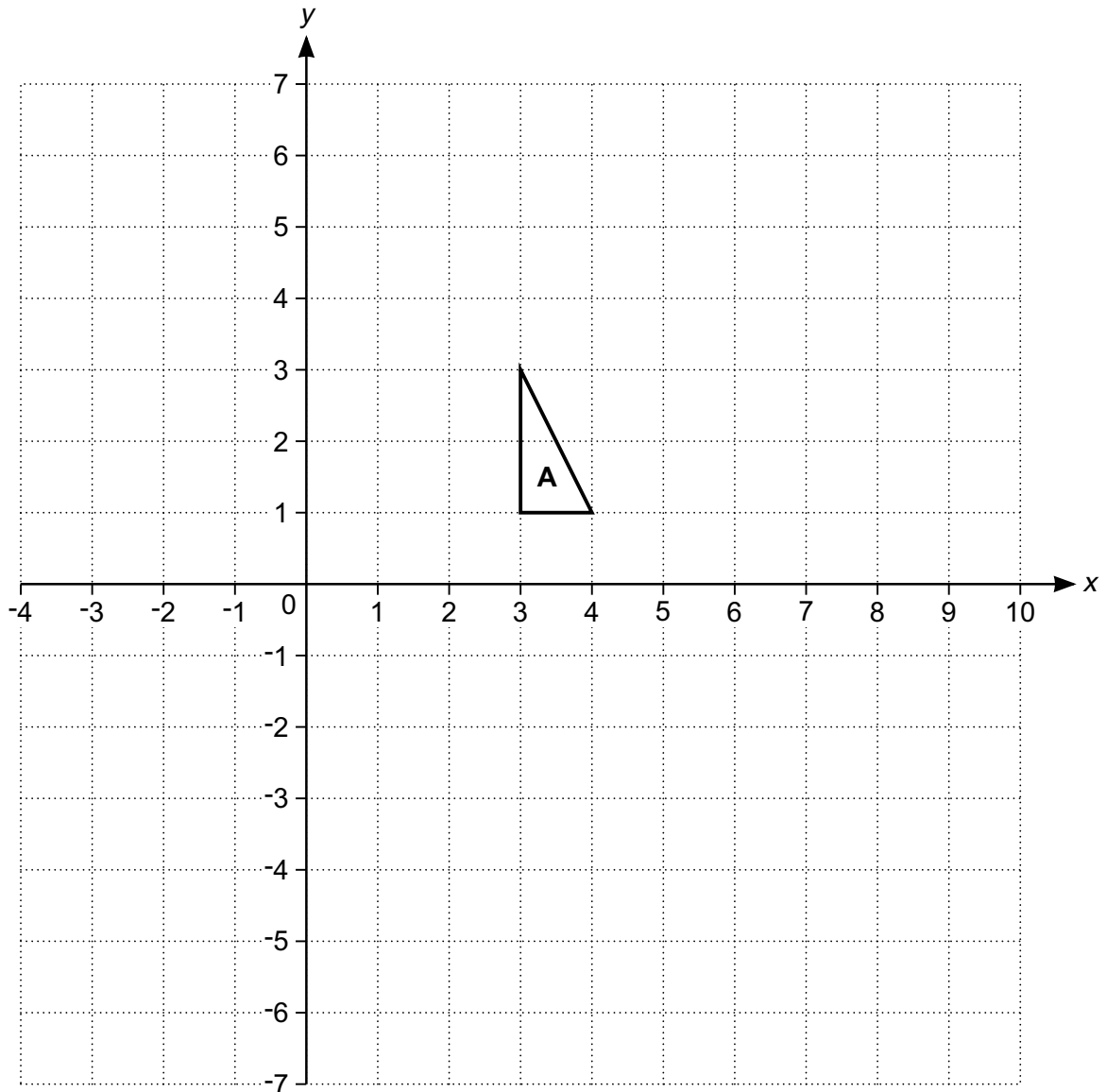
(a) ..... [1]

(b) Work out the value of  $k$ .

$$4^5 \times 2^{-4} = 2^k$$

(b) ..... [3]

9 Triangle **A** is drawn on the coordinate grid.



Zara and Sam each transform triangle **A** onto triangle **B**.

- Zara uses a rotation of  $90^\circ$  clockwise about the origin **followed by** a reflection in  $x = 3$ .
- Sam uses a reflection in  $y = -x$  **followed by** a transformation T.

(a) Draw and label triangle **B**.

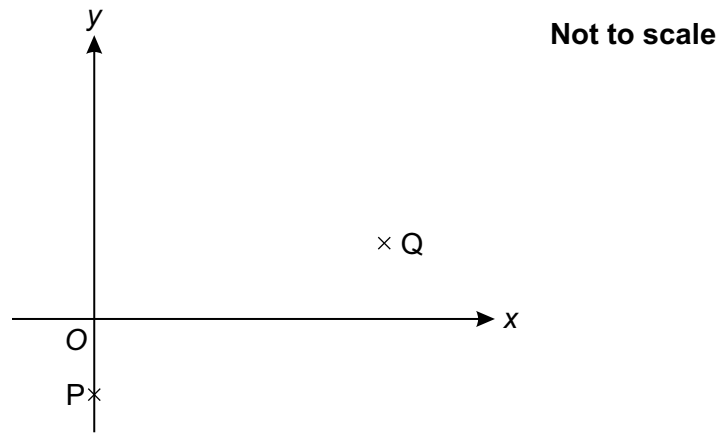
[3]

(b) Describe fully transformation T.

..... [3]



10 P has coordinates (0, -1) and Q has coordinates (4, 1).



(a) Find the equation of line PQ.

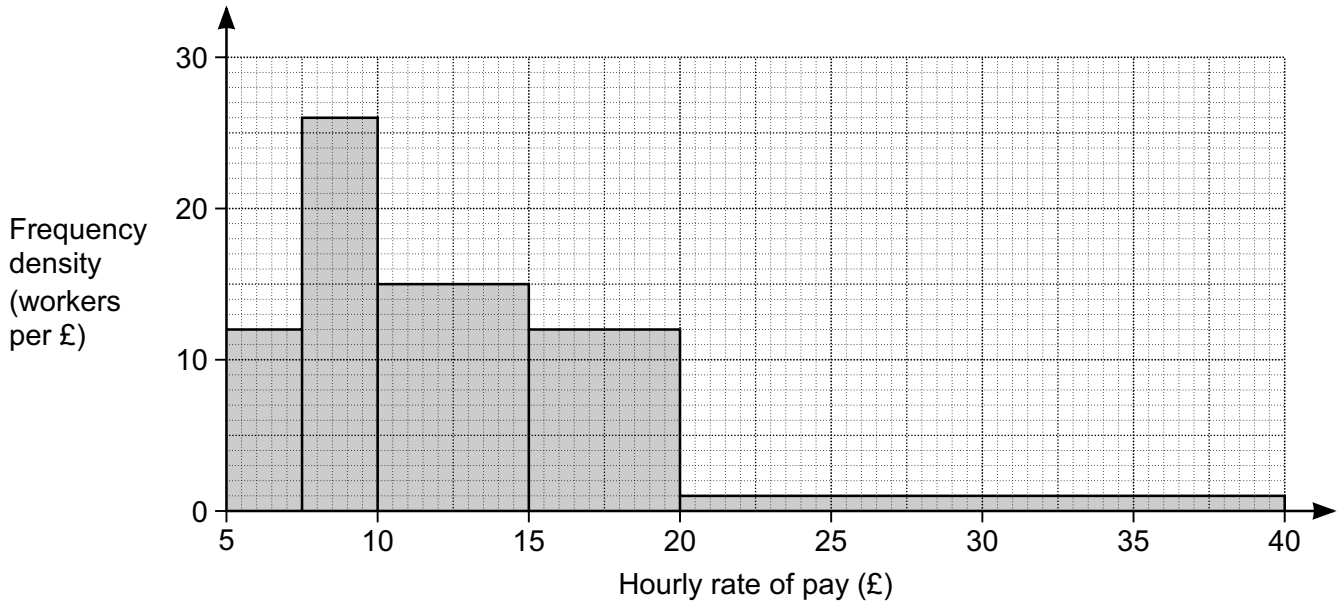
(a) ..... [3]

(b) P and Q are two vertices of rectangle PQRS.

Find the equation of line QR.

(b) ..... [3]

11 Omar surveyed a group of workers to find their hourly rate of pay. His results are summarised in the histogram.



(a) Show that Omar surveyed 250 workers.

[3]

(b) The UK living wage is £7.85 per hour.

A newspaper states that one fifth of workers earn less than the living wage.

(i) Does Omar's survey support the statement in the newspaper?  
Show how you decide.

.....

..... [4]

(ii) Explain why your calculations in part (b)(i) may not give the exact number of workers earning less than the living wage.

.....  
 ..... [1]

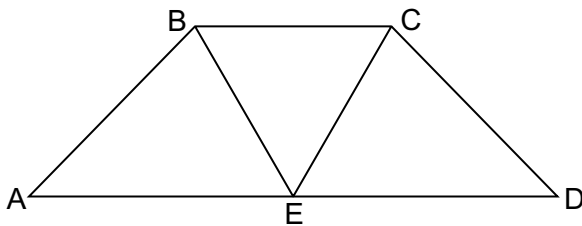
(c) Omar used this table to record the ages of the people in his survey.

Age ( $a$ years)	$18 \leq a < 20$	$20 \leq a < 30$	$30 \leq a < 40$	$40 \leq a < 50$	$50 \leq a < 70$

Comment on one problem with his table.

.....  
 ..... [1]

12 The diagram shows trapezium ABCD.  
 E is the midpoint of AD.  
 BCE is an equilateral triangle.

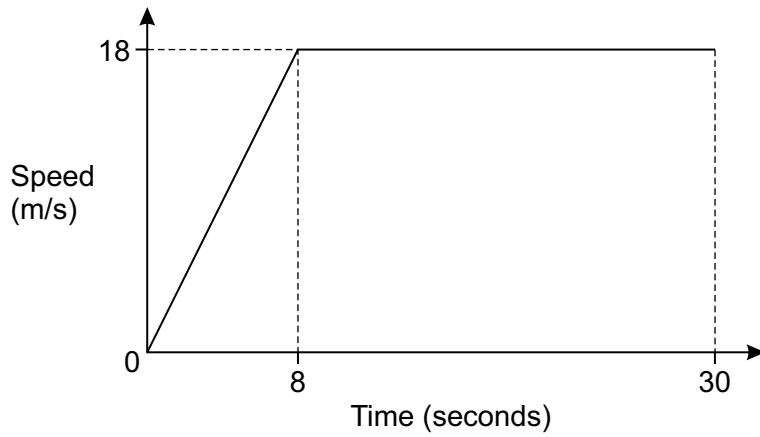


Not to scale

Prove that triangle ABE is congruent to triangle DCE.

.....  
 .....  
 .....  
 .....  
 .....  
 ..... [4]

13 (a) The graph shows the speed of a car during the first 30 seconds of its journey.



(i) State the acceleration of the car after 20 seconds.

(a)(i) .....  $\text{m/s}^2$  [1]

(ii) Find the total distance travelled by the car in the 30 seconds.

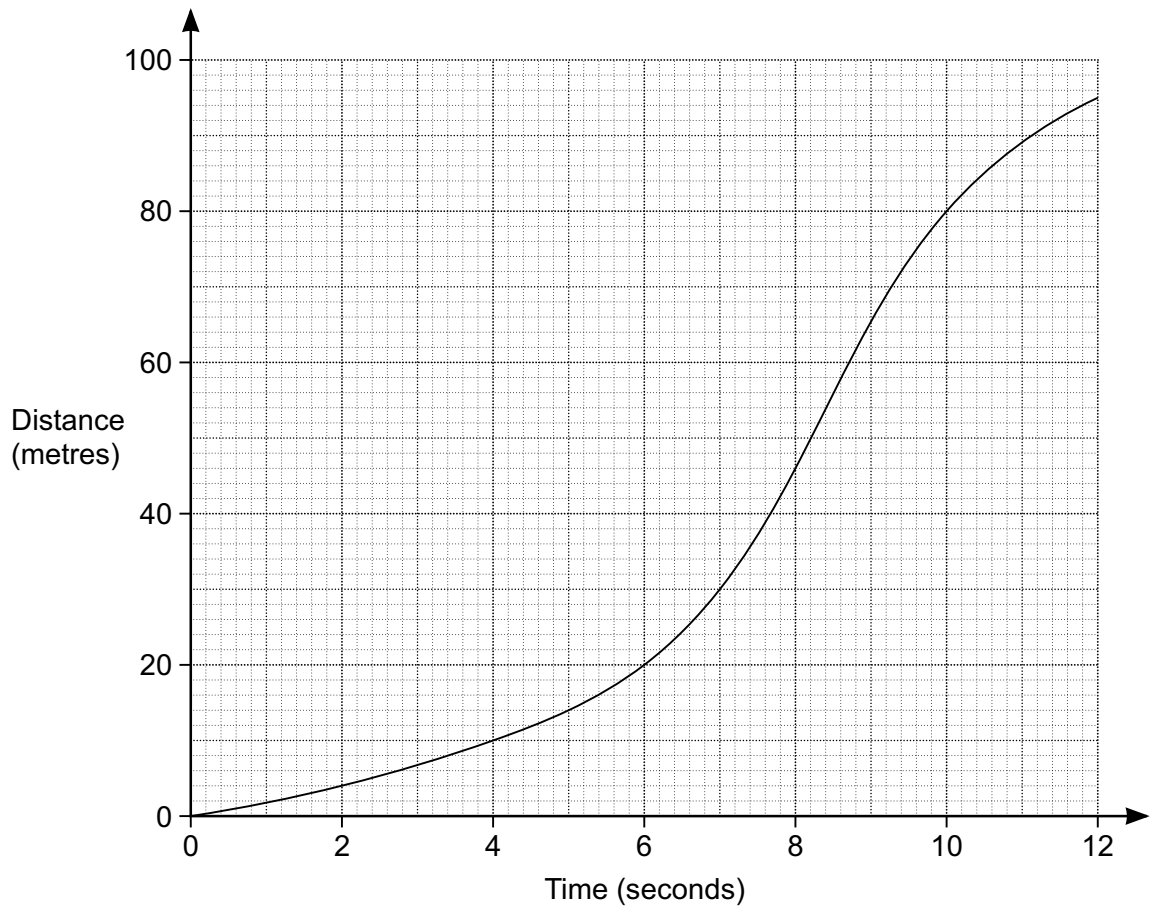
(ii) ..... m [3]

(b) The speed  $v$  of a train is 68 km/h, correct to the nearest km/h.

Write down an inequality to show the error interval for  $v$ .

(b) ..... [2]

(c) The graph shows the distance travelled by a lorry in 12 seconds.



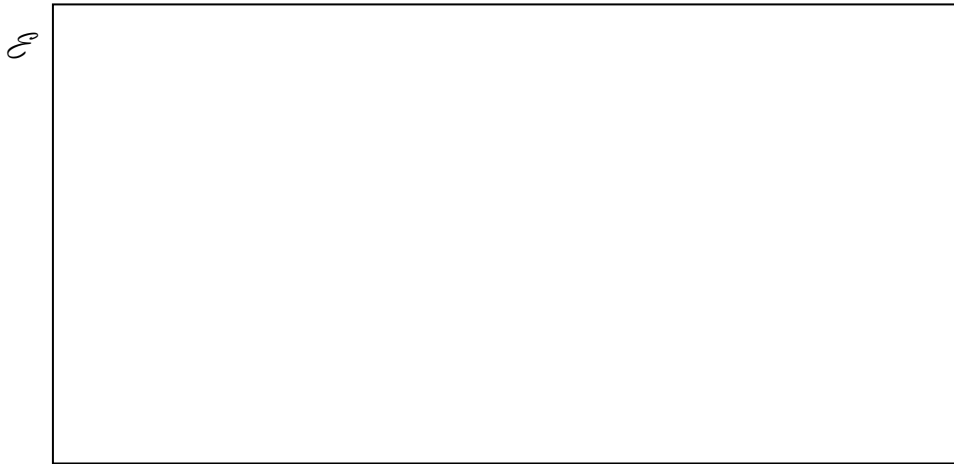
Estimate the speed of the lorry after 5 seconds.

(c) ..... m/s [4]

14 An activity camp has climbing and sailing classes.

- 50 children attend the activity camp.
- 35 children do climbing.
- 10 children do both classes.
- 2 children do neither class.

(a) Represent this information on a Venn diagram.



[3]

(b) A child attending the activity camp is selected at random.

Find the probability that this child

(i) did exactly one class,

(b)(i) ..... [2]

(ii) did sailing, given that they did not do climbing.

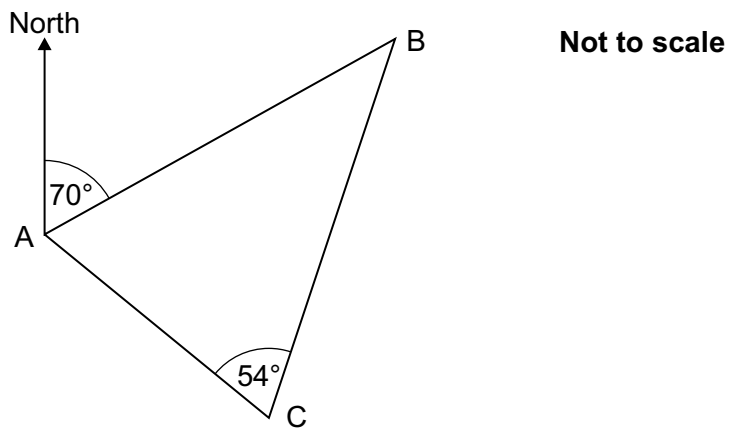
(ii) ..... [2]

15 Show that

$$\frac{4}{x-3} - \frac{2}{x+1} = \frac{2(x+5)}{(x-3)(x+1)}.$$

[3]

16 The diagram shows the positions of three hills, A, B and C.



B is 23 km from A on a bearing of  $070^\circ$ .

C is 15 km from A.

Angle  $ACB = 54^\circ$ .

Find the bearing of C from A.

..... [5]

- 17 A cuboid has length  $x$  cm.  
The width of the cuboid is 4 cm less than its length.  
The height of the cuboid is half of its length.

(a) The surface area of the cuboid is  $90 \text{ cm}^2$ .

Show that  $2x^2 - 6x - 45 = 0$ .

[5]

(b) Work out the volume of the cuboid.

(b) .....  $\text{cm}^3$  [6]

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