Write your name here

Surname	Other names

Pearson Edexcel International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics B

Paper 1

Tuesday 6 January 2015 – Afternoon
Time: 1 hour 30 minutes

Paper Reference
4MB0/01

You must have: Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.
- Without sufficient working, correct answers may be awarded no marks.

Turn over ▶

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P 4 4 6 1 5 A 0 1 2 4

PEARSON

Answer ALL TWENTY EIGHT questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Work out $3\frac{1}{8} \div 4\frac{1}{10}$

Show all your working and give your answer as a fraction in its simplest form.

.....

(Total for Question 1 is 2 marks)

2 $y = 4x - \frac{1}{2x}$

Find $\frac{dy}{dx}$

$\frac{dy}{dx} =$ .....

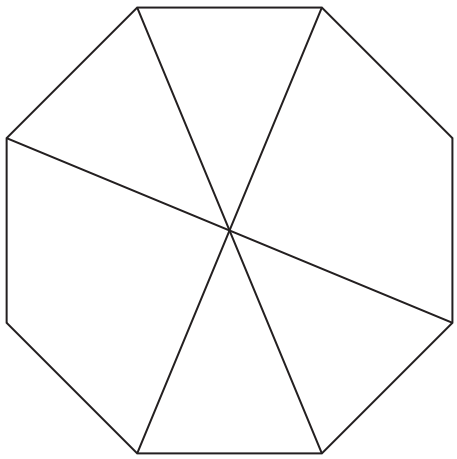
(Total for Question 2 is 2 marks)

3 Find the Lowest Common Multiple (LCM) of 28, 30 and 45

.....

(Total for Question 3 is 2 marks)

4



The diagram shows a regular octagon with three diagonals drawn.

Write down

(a) the number of lines of symmetry of the diagram,

.....

(1)

(b) the order of rotational symmetry of the diagram.

.....

(1)

(Total for Question 4 is 2 marks)

5 d is the determinant of the matrix A.

Given that $\mathbf{A} = \begin{pmatrix} 4x & 6 \\ 3 & 2 \end{pmatrix}$

(i) write down an expression for d in terms of x.

.....

(ii) Hence find the value of x for which $d = 2x$.

.....

(Total for Question 5 is 2 marks)

6 A straight line passes through the points with coordinates (1, 3) and (–5, –2).

Calculate the gradient of the line.

.....

(Total for Question 6 is 2 marks)

7 The weights of two bags are in the ratio 5 : 8

The weight of the heavier bag is 408 grams.

Calculate the weight, in grams, of the other bag.

..... grams

(Total for Question 7 is 2 marks)

8 (a) Work out the value of $\dfrac{4.4 \times 10^{5}}{2.6 \times 10^{-3} - 4.0 \times 10^{-4}}$

.....

(1)

(b) Write your answer to part (a) in standard form.

.....

(2)

(Total for Question 8 is 3 marks)

9 Here are the first 4 terms of a sequence

1 –3 9 –27

(i) Write down the next 2 terms of the sequence.

.....

(2)

(ii) Explain how you found your answer.

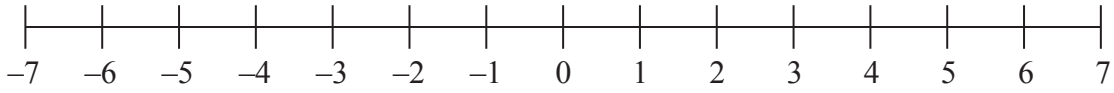
.....

.....

(1)

(Total for Question 9 is 3 marks)

10 Here is a number line



(a) Show on the number line the inequality $-5 < x \leqslant -1$

(2)

(b) Hence write down the integer values of x for which $-5 < x \leqslant -1$

.....

(1)

(Total for Question 10 is 3 marks)

11

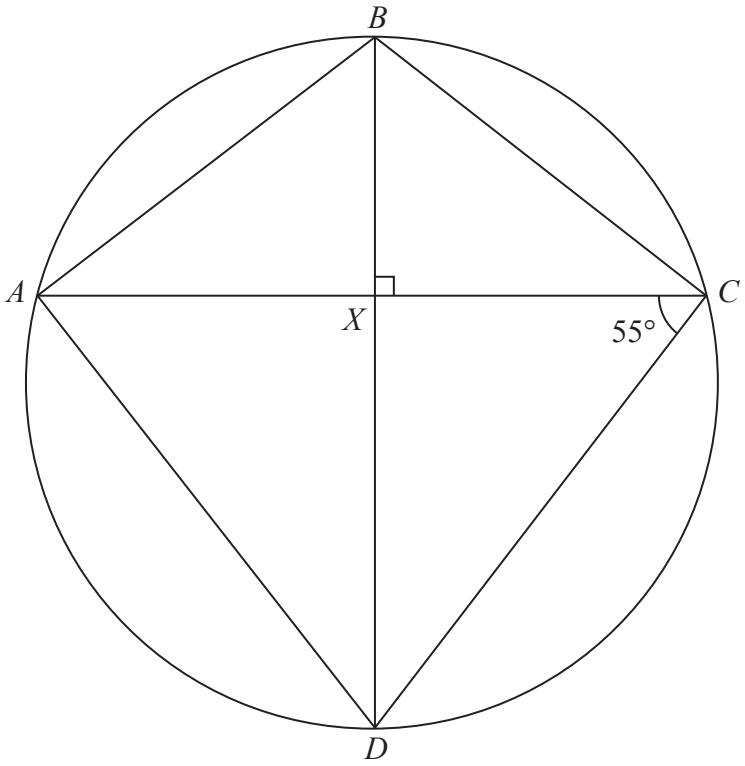


Diagram **NOT** accurately drawn

In the diagram, $ABCD$ is a circle with $\angle ABC = 110°$ and $\angle ACD = 55°$

The point X is such that AXC and BXD are straight lines, intersecting at right angles.

Show, giving your reasons, that ΔABC is isosceles.

(Total for Question 11 is 3 marks)

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12

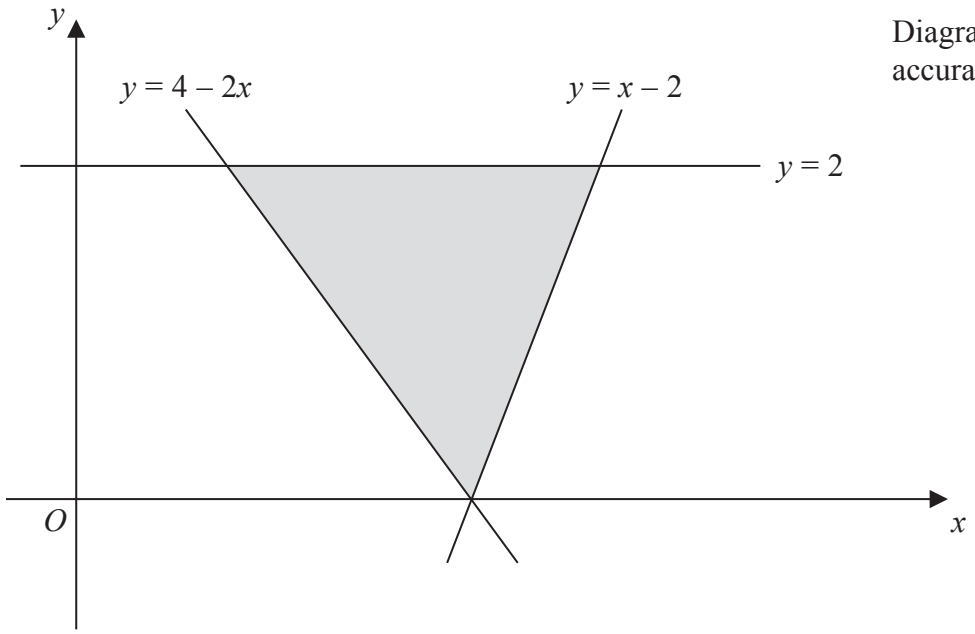

Diagram **NOT** accurately drawn

Write down the three inequalities that define the shaded region shown in the above diagram.

.....

.....

.....

(Total for Question 12 is 3 marks)

13

$$A = \{w, x, y, z\}$$

Write down all of the subsets of A that have exactly 2 elements.

.....

(Total for Question 13 is 3 marks)

14 Bob has a box of toy bricks.
He counts the numbers of red, yellow, green, black and white bricks in the box.

Here are his results

Red	350
Yellow	236
Green	154
Black	63
White	197

Bob is going to draw a pie chart for his results.

Calculate the size, in degrees, of the angle of the sector for red bricks.

.....°

(Total for Question 14 is 3 marks)

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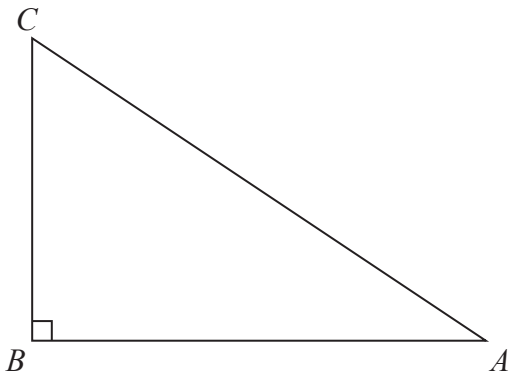
15



The diagram shows ΔABC in which $\angle ABC = 90°$

The perpendicular bisector of the line AC intersects the line AB at X.

Showing all your construction lines,

(a) draw the perpendicular bisector of the line AC and mark and label the point X.

(2)

(b) Measure and write down the length, in cm to 1 decimal place, of AX.

$AX =$ ..... cm

(1)

(Total for Question 15 is 3 marks)

16 Expand and simplify $3x - x[2 - x(1 - x)]$

.....

(Total for Question 16 is 3 marks)

17 (a) The function f is defined for all values of x by $f : x \mapsto x^2 - 6$

Write down

(i) the minimum value of $f(x)$,

.....

(ii) the range of f.

.....

(2)

(b) The function g is given by $g : x \mapsto \dfrac{x}{2x - 3}$

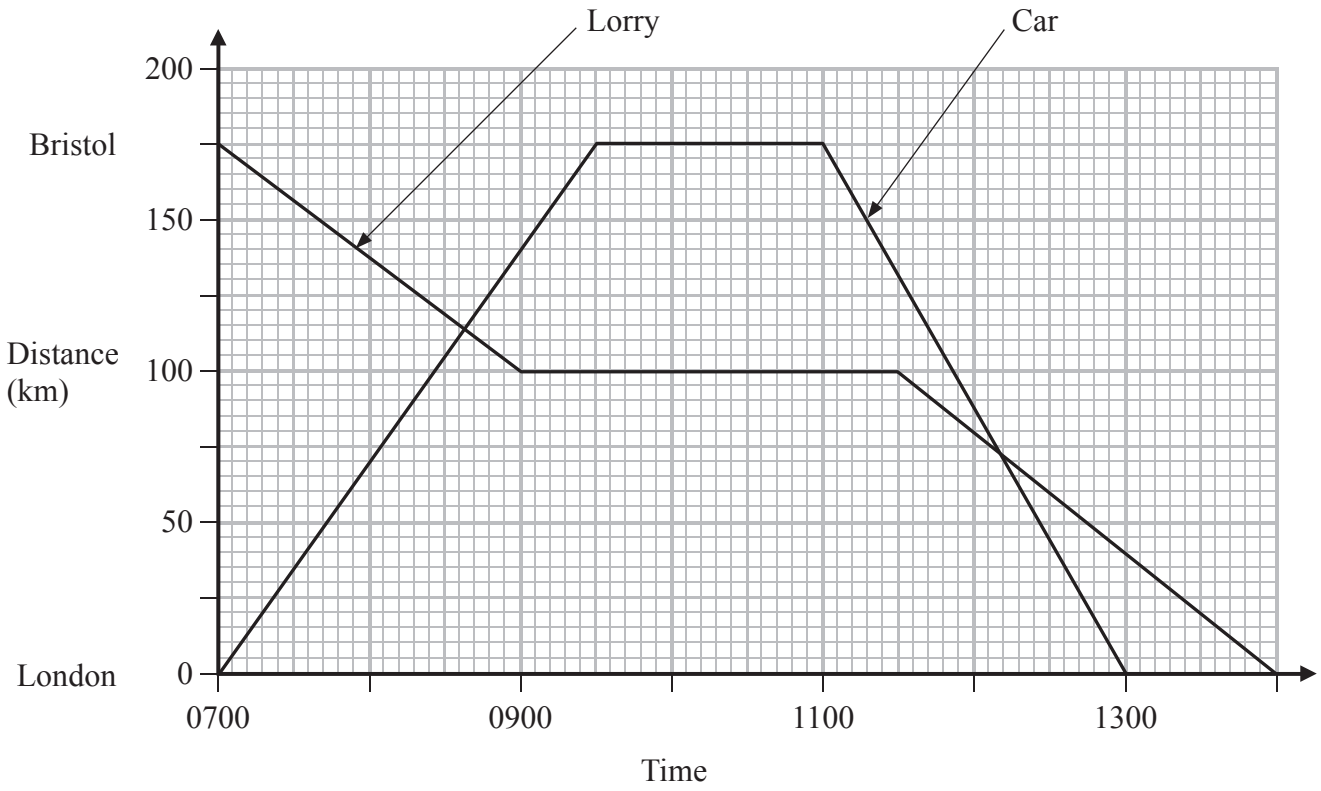
State the value of x that must be excluded from any domain of g.

.....

(1)

(Total for Question 17 is 3 marks)

18



The distance-time graph for the journey of a car between London and Bristol and the distance-time graph for the journey of a lorry travelling from Bristol to London are shown on the grid. The car and the lorry travel along the same roads.

(a) For how long was the car stationary in Bristol?

.....

(1)

(b) Calculate the average speed, in km/h, of the car as it travelled back from Bristol to London.

..... km/h

(2)

(c) At what time did the car overtake the lorry when they were both travelling in the same direction?

.....

(1)

(Total for Question 18 is 4 marks)

19

$$\mathbf{A} = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} \qquad \mathbf{B} = \begin{pmatrix} 3 & 2 \\ 1 & 1 \end{pmatrix}$$

Find **AB – BA**

$\begin{pmatrix} \quad & \quad \\ \quad & \quad \end{pmatrix}$

(Total for Question 19 is 4 marks)

20 y varies inversely as the square of x.

When $x = 3$, $y = 28$

Calculate the values of x when $y = 63$

.....

(Total for Question 20 is 4 marks)

21

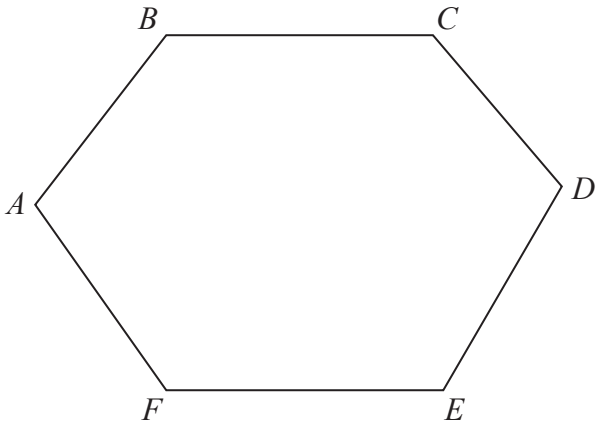


Diagram **NOT** accurately drawn

ABCDEF is a regular hexagon.

Calculate, in degrees, the size of

(a) $\angle ABC$

$\angle ABC =$ ..... °

(2)

(b) $\angle DAE$

$\angle DAE =$ ..... °

(3)

(Total for Question 21 is 5 marks)

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22 A pupil waits at a bus stop each day for the school bus.

Here are the number of minutes the pupil waited each day for eleven days

6 5 11 9 4 8 5 14 6 5 4

(a) Write down the mode.

..... minutes

(1)

(b) Find the median.

..... minutes

(2)

(c) Work out the mean.

..... minutes

(2)

(Total for Question 22 is 5 marks)

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23

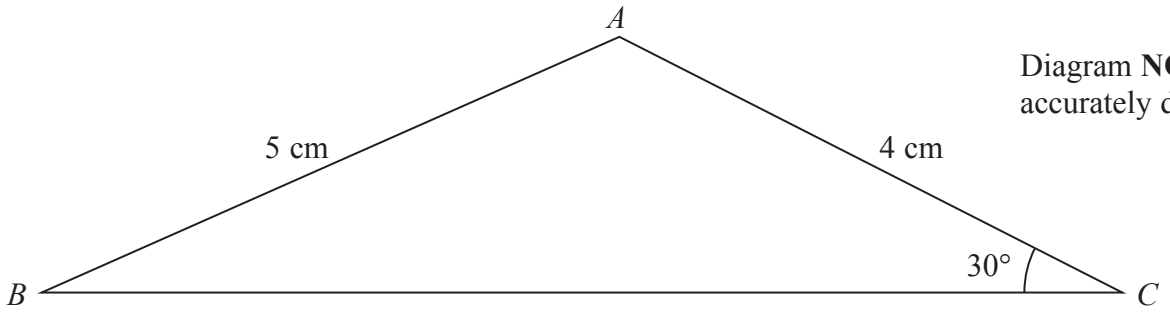

Diagram **NOT** accurately drawn

In triangle ABC, $AB = 5$ cm, $AC = 4$ cm and $\angle ACB = 30°$

Calculate the length, in cm to 3 significant figures, of BC.

$BC =$ ..... cm

(Total for Question 23 is 5 marks)

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24 A rectangle has length 2 m and width 50 cm.

Inside the rectangle are 300 identical triangles.

Each triangle is isosceles, with sides of length 5 cm, 5 cm and 6 cm.

Each triangle is completely within the rectangle and no triangle overlaps any other triangle.

Express the total area covered by these 300 triangles as a percentage of the area of the rectangle.

.....%

(Total for Question 24 is 5 marks)

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25

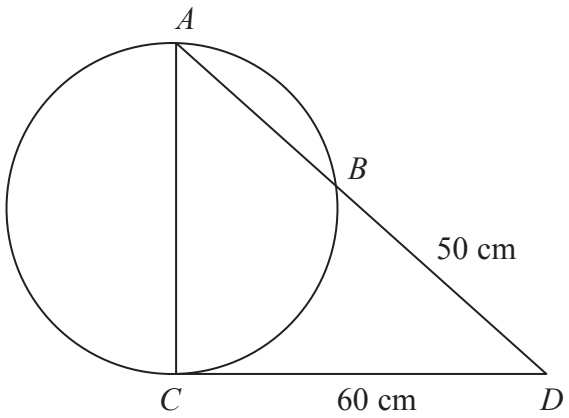

Diagram **NOT** accurately drawn

In the diagram, ABC is a circle with diameter AC.

CD is the tangent to the circle ABC at C and $CD = 60$ cm.

ABD is a straight line and $BD = 50$ cm.

Calculate the length, in cm, of

(a) DA,

..... cm

(2)

(b) the radius of the circle ABC.

Give your answer to 3 significant figures.

..... cm

(3)

(Total for Question 25 is 5 marks)

26 A particle, P, is moving along a straight line. At time t seconds, the displacement, s metres, of P from a fixed point O of the line is given by

$$s = 5 + 90t + 14t^2 - t^3 \qquad 0 \leqslant t \leqslant 18$$

At time t seconds, the velocity of P is v m/s.

(a) Find an expression for v in terms of t.

$v =$ .....

(2)

(b) Find the time, in seconds, when the particle is instantaneously at rest.

Give your answer to 3 significant figures.

..... seconds

(4)

(Total for Question 26 is 6 marks)

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27

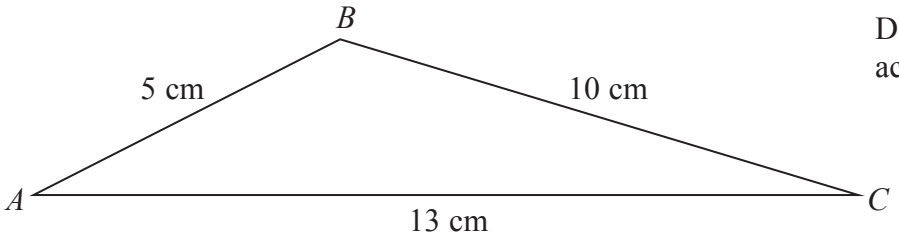

Diagram **NOT** accurately drawn

The diagram shows ΔABC in which $AB = 5$ cm, $AC = 13$ cm and $BC = 10$ cm.

(a) Calculate the size, in degrees to 3 significant figures, of $\angle BAC$.

$\angle BAC =$ ..... °

(3)

The line AB is extended to the point Y so that the line CY is perpendicular to the line ABY.

(b) Calculate the area, in cm^2 to 3 significant figures, of ΔBCY.

..... cm^2

(4)

(Total for Question 27 is 7 marks)

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28 $(x + 3)$ is a factor of $6x^3 + 11x^2 + kx + 6$

where k is a constant.

(a) Work out the value of k

.....

(2)

(b) Using this value of k, fully factorise $6x^3 + 11x^2 + kx + 6$

.....

(4)

(Total for Question 28 is 6 marks)

TOTAL FOR PAPER IS 100 MARKS

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