Write your name here

Surname	Other names

Pearson Edexcel
International GCSE

Centre Number	Candidate Number

Mathematics B

Paper 1

Thursday 21 May 2015 – Morning
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 3 9 4 A 0 1 2 0

PEARSON

Answer ALL TWENTY-NINE questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Yuen is going to draw a bar chart for the number of lorries and the number of cars that passed his house in one hour.

The height of the bar in the bar chart representing the 155 lorries that passed his house is 5 cm.

The height of the bar in the bar chart representing the number of cars that passed his house is 8 cm.

Calculate the number of cars that passed his house.

.....

(Total for Question 1 is 2 marks)

2 The non-zero vectors **a** and **b** are not parallel.

Given that $(2x - 2)\mathbf{a} - y\mathbf{b} = 4\mathbf{a} + 2\mathbf{b}$

find the value of x and the value of y.

$x =$ ....., $y =$ .....

(Total for Question 2 is 2 marks)

3

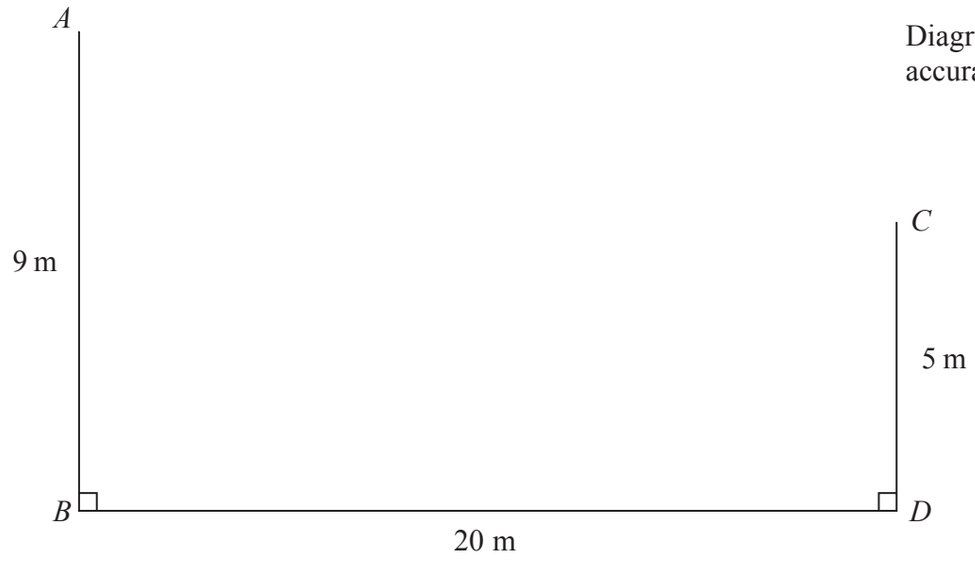


Diagram **NOT** accurately drawn

The diagram shows two vertical masts, *AB* and *CD*, that are 20 m apart on horizontal ground.

The height of *AB* is 9 m and the height of *CD* is 5 m.

Calculate the size of the angle of elevation, in degrees to one decimal place, of *A* from *C*.

..... °

(Total for Question 3 is 2 marks)

4 The *n*th term of a sequence is given by $3n - 4$

Write down the first three terms of the sequence.

....., ..., ...

(Total for Question 4 is 2 marks)

5 Find the value of the determinant of the matrix $\begin{pmatrix} 3 & 7 \\ 1 & 5 \end{pmatrix}$

.....

(Total for Question 5 is 2 marks)

6 The point A (5, −3) is mapped onto the point B under the translation $\begin{pmatrix} -7 \\ -6 \end{pmatrix}$

Find the coordinates of the point B.

.....

(Total for Question 6 is 2 marks)

7 Find the greatest integer n such that $9n + 50 \leqslant 27$

.....

(Total for Question 7 is 2 marks)

8 Find the Highest Common Factor (HCF) of 42, 84 and 154

HCF = ...

(Total for Question 8 is 2 marks)

9 $81 = 3^{3x-11}$

Calculate the value of x.

x = ...

(Total for Question 9 is 3 marks)

10 The straight line joining the points with coordinates $(1, -2a)$ and $(a, 1)$ has gradient 5

Find the value of a.

a = ...

(Total for Question 10 is 3 marks)

11 In a country, the number of people who are more than 60 years old is 23% of the population.

Of these people who are more than 60 years old, 42% are men.

The population of the country is 50 million.

Calculate, to the nearest million, the number of **women** in this country who are more than 60 years old.

.....million

(Total for Question 11 is 3 marks)

12 Given that x is positive, make x the subject of $y = \frac{a}{x^2} - b$

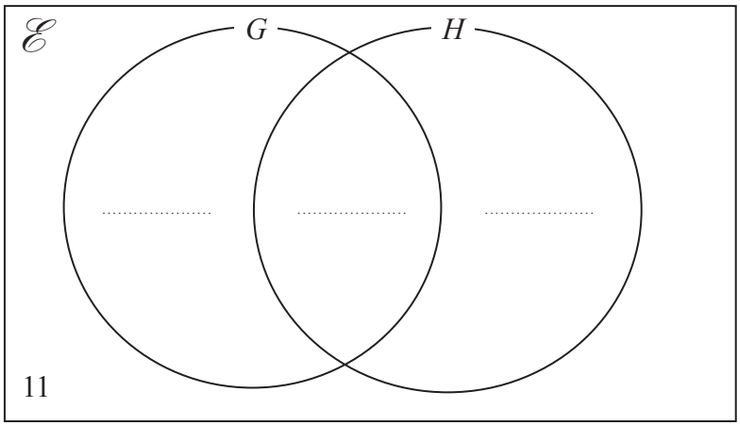
$x =$ .....

(Total for Question 12 is 3 marks)

13 In a class, some students study Geography (G), some students study History (H) and 11 students study neither Geography nor History, as shown in the Venn diagram.

Of the students in the class, 12 study Geography, 19 study History and 10 study both Geography and History.

(a) Complete the Venn diagram to show this information.



(2)

(b) Work out how many students in the class do not study Geography.

.....

(1)

(Total for Question 13 is 3 marks)

14 The probability that a plane lands on time at an airport is 0.76

Mary has a list of all the planes that are due to land at the airport on Monday. She picks at random a plane from this list.

(a) Write down the probability that this plane **will not** land on time at the airport on Monday.

.....

(1)

600 planes land at this airport each day.

(b) Work out an estimate for the number of planes that **do not** land on time at this airport each day.

.....

(2)

(Total for Question 14 is 3 marks)

15 Given that $P = (243)^{-\frac{4}{5}}$

(a) write down the value of the integer m so that $P = \frac{1}{m}$

$m =$ .....

(1)

(b) write P in standard form, giving your answer to 3 significant figures.

.....

(2)

(Total for Question 15 is 3 marks)

16

$\mathscr{E} = \{ a, b, c, d, e, f, g, h, i, j \}$

$A = \{ a, b, e, f \}$

$B = \{ b, c, d, e, g, h \}$

$C = \{ e, f, g, h, i, j \}$

List the elements of the sets

(a) $A \cap B \cap C$

.....

(1)

(b) $(A \cup B)'$

.....

(1)

(c) $B \cap C'$

.....

(1)

(Total for Question 16 is 3 marks)

17 Given that p and q are positive integers, express

$\dfrac{18\sqrt{36} - 6\sqrt{12}}{3\sqrt{24}}$ in the form $\sqrt{p} - \sqrt{q}$

Show all your working.

.....

(Total for Question 17 is 3 marks)

18

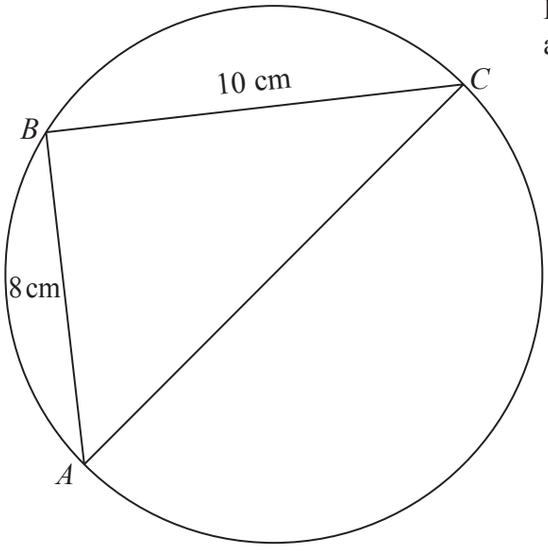


Diagram **NOT** accurately drawn

A, *B* and *C* are points on a circle with diameter *AC*.

AB = 8 cm
BC = 10 cm

Calculate the area, in cm^2 to 3 significant figures, of the circle.

.....cm^2

(Total for Question 18 is 4 marks)

19 Solve the simultaneous equations

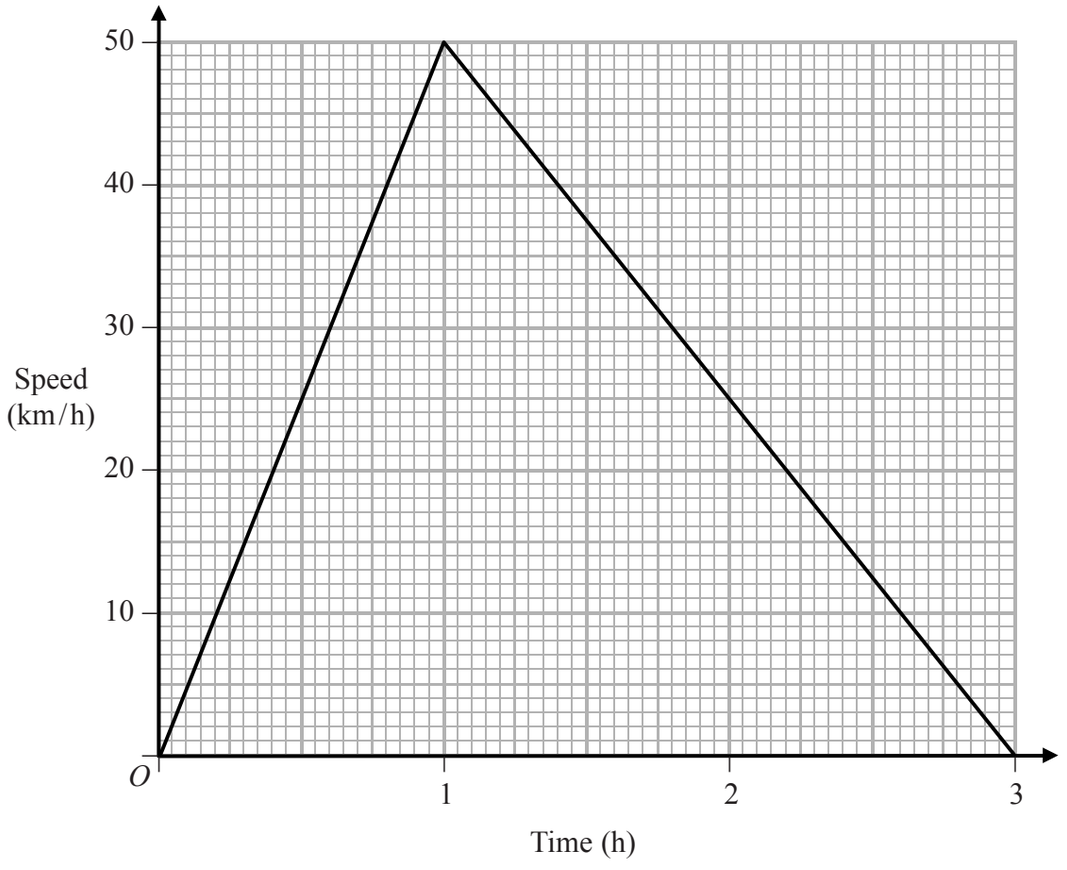
$$x + 3y = 10$$
$$3x - y = 1$$

$x =$ .....

$y =$ .....

(Total for Question 19 is 4 marks)

20



The figure shows the speed-time graph for a journey lasting 3 hours.

Find

(a) the total distance, in km, travelled in the 3 hours,

..... km

(2)

(b) the average speed, in km/h, for the journey,

..... km/h

(1)

(c) for how many hours of the journey the actual speed was greater than the average speed.

..... hours

(1)

(Total for Question 20 is 4 marks)

21 Here is a list of numbers

$$(-2)^0 \qquad \frac{63}{105} \qquad 4 \qquad 0.5$$

(a) Write down

(i) the smallest number in the list,

(ii) the largest number in the list.

smallest .....

largest .....

(2)

(b) Calculate the mean of the four numbers in the list.

.....

(2)

(Total for Question 21 is 4 marks)

22 A bag contains 3 white balls, 7 brown balls and 10 green balls.

Ahmed takes at random a ball from the bag and then puts the ball back into the bag.

(a) Write down the probability that the ball was brown.

.....

(1)

Ahmed now takes at random two balls from the bag, without replacing them.

Ahmed puts the two balls on a table.

(b) Find the probability that the balls on the table are one white ball and one brown ball or are two green balls.

.....

(3)

(Total for Question 22 is 4 marks)

23

$$\mathbf{A} = \begin{pmatrix} x & 4-6x \\ 6+3y & 4y \end{pmatrix}, \quad \mathbf{B} = \begin{pmatrix} 2x & 2-8x \\ 7+4y & -y \end{pmatrix}, \quad \mathbf{C} = \begin{pmatrix} 4 & 10 \\ 3 & 19 \end{pmatrix}$$

Given that $4\mathbf{A} - 3\mathbf{B} = \mathbf{C}$, calculate the value of x and the value of y.

$x =$ ....., $y =$ .....

(Total for Question 23 is 4 marks)

24

The three points A, B and M, on horizontal ground, are to be shown on a map.

The point B is 30 km due south of the point A.

Using a scale of 1 cm to represent 5 km,

(a) find and label the position of the point B on the map.

(1)

The point M is due east of A.

The bearing of M from the point B is 037°

(b) Find and label the position of the point M on the diagram.

(2)

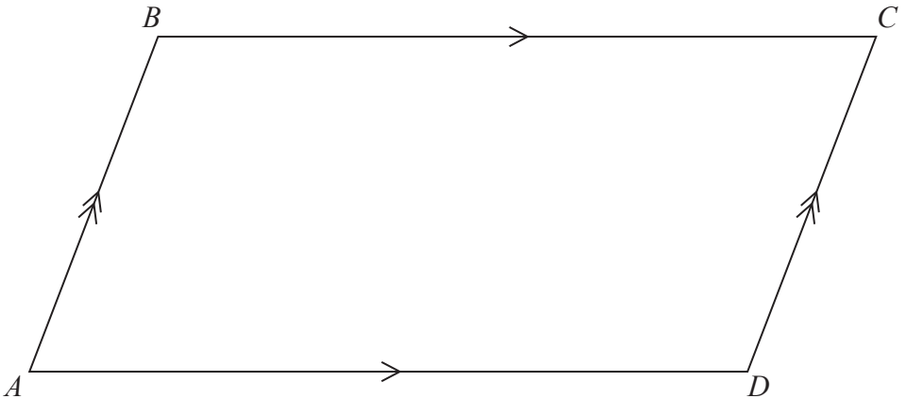
(c) Find by measurement from the map, the distance, in km, of M from A.

..... km

(1)

(Total for Question 24 is 4 marks)

25



The diagram shows the parallelogram *ABCD*.

Showing all of your construction lines, construct the locus of all points inside the parallelogram

(a) that are 6 cm from *A*,

(1)

(b) that are equidistant from *AB* and *AD*.

(2)

The point *E* inside the parallelogram is 6 cm from *A* and equidistant from *AB* and *AD*.

(c) Find by measurement the distance, in cm, of *E* from *C*.

..... cm

(1)

The region *R* consists of all the points inside the parallelogram that are less than 6 cm from *A* and closer to *AD* than to *AB*.

(d) Show by shading the region *R*.

Label the region *R*.

(1)

(Total for Question 25 is 5 marks)

26 The **circumference** of a circle is 12 cm.

A sector of this circle has an angle of 72° at the centre of the circle.

The area of this sector is A cm^2

(a) Find an expression for A in terms of π

Simplify your expression.

(3)

The perimeter of the sector is P cm.

(b) Show that $P = \dfrac{12(\pi + 5)}{5\pi}$

(3)

(Total for Question 26 is 6 marks)

27 $y = \frac{x}{2} - \frac{1}{2x}$

(a) Find $\frac{dy}{dx}$

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

(2)

(b) Hence find the values of x for which $\frac{dy}{dx} = \frac{3}{x} - 2$

.....

(5)

(Total for Question 27 is 7 marks)

28

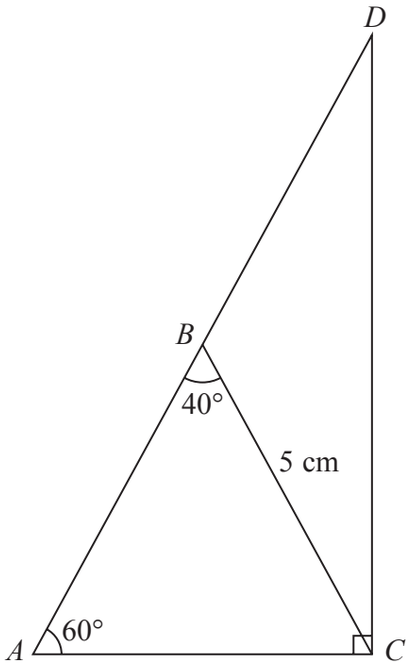


Diagram **NOT** accurately drawn

The diagram shows ΔABC in which $BC = 5$cm, $\angle BAC = 60°$ and $\angle ABC = 40°$

(a) Calculate the length, in cm to 3 significant figures, of AC.

..... cm

(3)

The point D is such that ABD is a straight line and DC is perpendicular to AC.

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

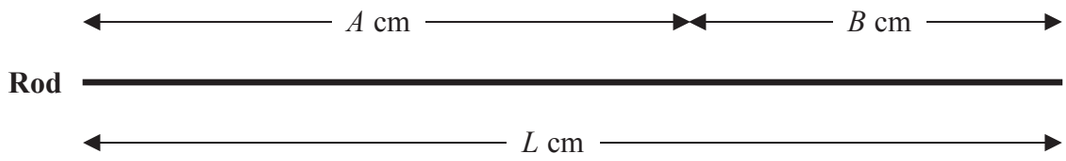
..... cm^2

(4)

(Total for Question 28 is 7 marks)

29

Diagram **NOT** accurately drawn



The diagram shows a rod of length L cm, divided into two unequal lengths of A cm and B cm.

Given that $A:L = \lambda:1$ and that $A:B = \mu:1$ where λ and μ are constants, find μ in terms of λ.

$\mu =$ .....

(Total for Question 29 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS