Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Tuesday 21 May 2019

Morning (Time: 1 hour 30 minutes) | Paper Reference **4MB1/01**

Mathematics B

Paper 1

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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1/1/1/1/

P 6 0 2 5 6 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 (a) Write 8693 to 2 significant figures.

.....

(1)

(b) Write 0.0374 to 2 significant figures.

.....

(1)

(Total for Question 1 is 2 marks)

---

2 Find the Lowest Common Multiple (LCM) of 18, 30 and 48
Show your working clearly.

.....

(Total for Question 2 is 2 marks)

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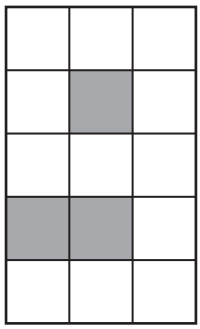
3 A pattern is made with white squares and shaded squares.

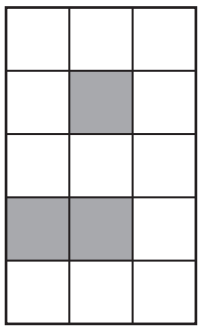
(a)



Shade **one** more square to make a pattern with exactly 1 line of symmetry.

(1)

(b)



Shade **one** more square to make a pattern with rotational symmetry of order 2

(1)

(Total for Question 3 is 2 marks)

4 Work out $2\frac{1}{4} \div 3\frac{5}{6}$

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

.....

(Total for Question 4 is 2 marks)

5 Given that $y = 2x^4 - \frac{3}{x^2}$

find $\frac{dy}{dx}$

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

(Total for Question 5 is 2 marks)

6 A straight line passes through the points with coordinates (2, –10) and (–3, 5)

Calculate the gradient of the line.

.....

(Total for Question 6 is 2 marks)

7 Expand and simplify $(4x - 5)(2x + 3)$

.....

(Total for Question 7 is 2 marks)

8 The nth term of a sequence is given by $24 - 5n$

Find the sum of the 3rd term and the 10th term of the sequence.

.....

(Total for Question 8 is 2 marks)

9 Each exterior angle of a regular polygon is 9°

Calculate the number of sides of the polygon.

.....

(Total for Question 9 is 2 marks)

10 In a sale, the price of a book is reduced by 15%
The price of the book before the sale was £7.60

Calculate the sale price of the book.

£ .....

(Total for Question 10 is 2 marks)

11 (a) Simplify $2x^2 \times 3x^5$

.....

(1)

(b) Simplify $(4a^2b^3)^3$

.....

(2)

(Total for Question 11 is 3 marks)

12 The function f is defined for all values of x by $f : x \mapsto x^2 - 2$

(a) Write down the range of f.

.....

(1)

The function g is given by $g : x \mapsto \dfrac{12}{x^3 + 4}$ where $x \neq \sqrt[3]{-4}$

(b) Calculate fg(2)

.....

(2)

(Total for Question 12 is 3 marks)

13 (a) Find the value of $3c^2$ when $c = -8$

.....

(1)

(b) Factorise completely $3c^2 + 6c$

.....

(2)

(Total for Question 13 is 3 marks)

14 Simplify fully $\dfrac{3x^2 - 8x - 3}{4x^2 - 36}$

.....

(Total for Question 14 is 3 marks)

15

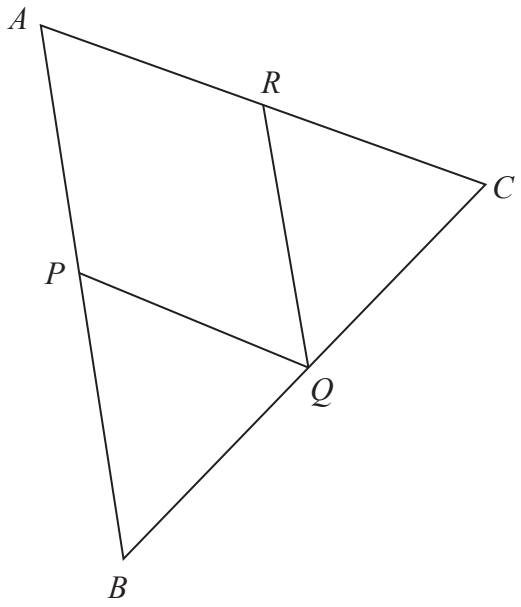


Diagram **NOT** accurately drawn

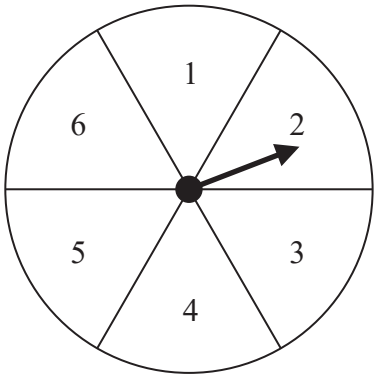
The diagram shows $\triangle ABC$.

$APQR$ is a parallelogram where P is the midpoint of AB, Q is the midpoint of BC and R is the midpoint of AC.

Prove that $\triangle PBQ$ and $\triangle RQC$ are congruent.

(Total for Question 15 is 3 marks)

16 Here is a biased spinner labelled 1, 2, 3, 4, 5, 6



The table below shows information about the probability that when the spinner is spun once it will land on each of the numbers 1, 2, 3, 4, 5, 6

Number	1	2	3	4	5	6
Probability	0.05	0.1	$2x - 0.1$	0.2	0.3	$3x + 0.2$

Abdul is going to spin the spinner 300 times.

(a) Calculate an estimate for the number of times the spinner will land on number 1

.....

(1)

(b) Calculate the probability that when the spinner is spun once it lands on number 6

.....

(3)

(Total for Question 16 is 4 marks)

17 Here is $\triangle ABC$.

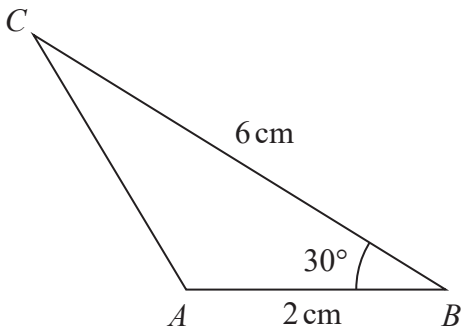


Diagram **NOT** accurately drawn

(a) Calculate the area, in cm^2, of $\triangle ABC$.

.....cm^2

(2)

Here is $\triangle PQR$.

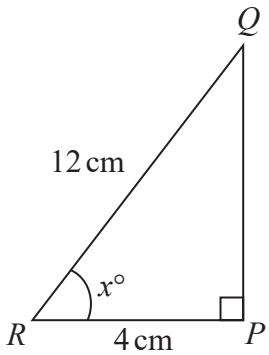


Diagram **NOT** accurately drawn

(b) Calculate the value, to 3 significant figures, of x.

$x =$ .....

(2)

(Total for Question 17 is 4 marks)

18 There are 9 marbles in bag *A* and 11 marbles in bag *B*.

In bag *A*, there are 3 red marbles, 2 yellow marbles and 4 green marbles.
In bag *B*, there are 2 red marbles, 4 yellow marbles and 5 purple marbles.

Ted takes at random one marble from bag *A* and one marble from bag *B*.

Calculate the probability that the two marbles are **not** the same colour.

.....

(Total for Question 18 is 4 marks)

19 The period, T seconds, of a simple pendulum of length L metres is given by the formula

$$T = 6.28\sqrt{\frac{L}{g}}$$

$L = 1.32$ to 3 significant figures.

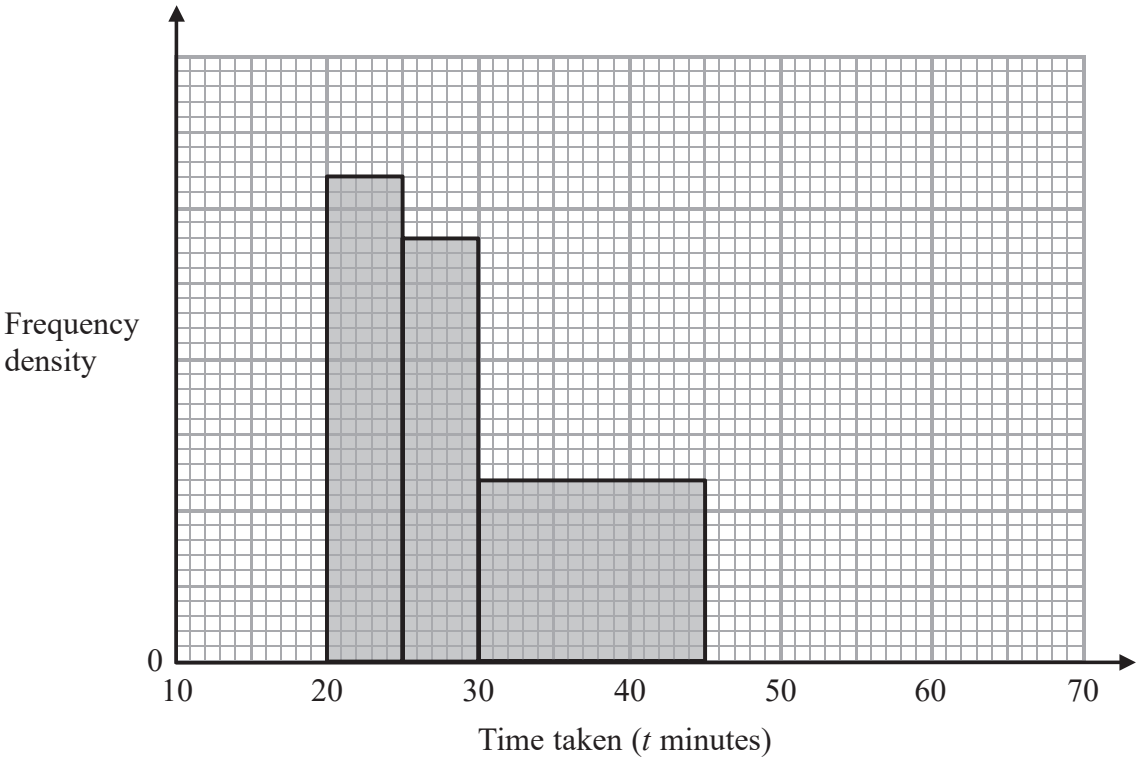
$g = 9.8$ to 2 significant figures.

Calculate the upper bound, to 3 significant figures, of T.

.....

(Total for Question 19 is 4 marks)

20 The incomplete histogram and the incomplete table give information about the time taken, in minutes, for some students to each complete a piece of homework. No student took less than 10 minutes to complete the homework and no student took longer than 60 minutes to complete the homework.



Time taken (t minutes)	Number of students
$10 \leqslant t < 20$	5
$20 \leqslant t < 25$	8
$25 \leqslant t < 30$	
$30 \leqslant t < 45$	
$45 \leqslant t < 60$	3

Complete the histogram and the table.

(Total for Question 20 is 4 marks)

21 Make x the subject of

$$\frac{x}{3} - 5 = \frac{x + 2y}{3w - 2y}$$

Give your answer as a single fraction.

.....

(Total for Question 21 is 4 marks)

22

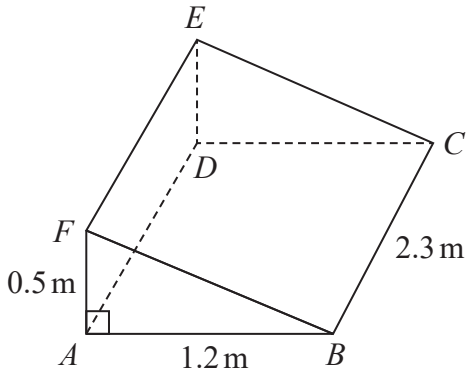


Diagram **NOT** accurately drawn

ABCDEF is a right triangular prism in which

$AB = 1.2\,\text{m}$ $BC = 2.3\,\text{m}$ $AF = 0.5\,\text{m}$ $\angle FAB = 90°$

Calculate the total surface area, in m^2, of the prism.

.....m^2

(Total for Question 22 is 5 marks)

23 In a survey, 60 students were asked whether they study any of History (H), Geography (G) or Latin (L).

Of these students

27 study History

25 study Geography

18 study Latin

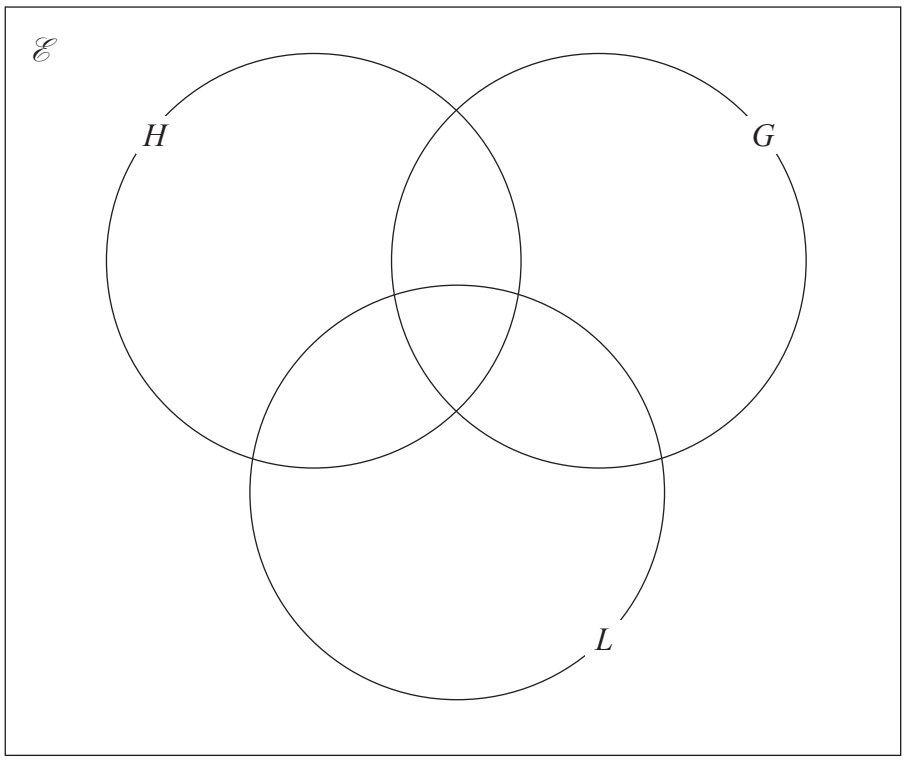
13 study both History and Latin

2 study both Geography and Latin

8 study History only

No students study History and Geography and Latin.

(a) Use the information to complete the Venn diagram.



(3)

(b) Find the number of students who study History but not Latin.

.....

(1)

(c) Find n($H' \cap [L \cup G]$)

.....

(1)

(Total for Question 23 is 5 marks)

24

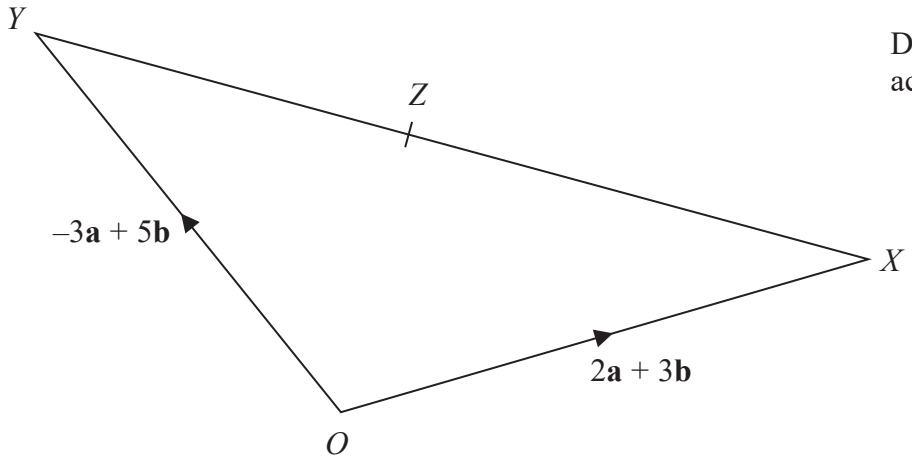


Diagram **NOT** accurately drawn

The diagram shows $\triangle OXY$ where $\overrightarrow{OX} = 2\mathbf{a} + 3\mathbf{b}$ and $\overrightarrow{OY} = -3\mathbf{a} + 5\mathbf{b}$

(a) Find and simplify an expression, in terms of **a** and **b**, for $\overrightarrow{YX}$.

.....

(2)

The point Z on YX is such that $\overrightarrow{OZ} = -\frac{2}{9}\mathbf{a} + \frac{35}{9}\mathbf{b}$

(b) Calculate, in its simplest form, the ratio of $YZ : ZX$

.....

(3)

(Total for Question 24 is 5 marks)

25

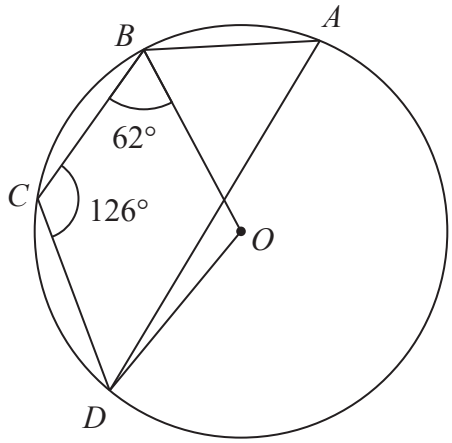


Diagram **NOT** accurately drawn

In the diagram, A, B, C and D are points on a circle, centre O.

$\angle CBO = 62°$ and $\angle BCD = 126°$

(a) Find the size, in degrees, of $\angle BAD$.

Give a reason for your answer.

$\angle BAD =$ ..... °

(2)

(b) Find the size, in degrees, of $\angle ODC$.

Give reasons for your working.

$\angle ODC =$ ..... °

(4)

(Total for Question 25 is 6 marks)

26

$$\mathbf{A} = \begin{pmatrix} 2 & 3 \\ -5 & 1 \end{pmatrix} \qquad \mathbf{B} = \begin{pmatrix} 4 & k \\ 1 & -1 \end{pmatrix}$$

The determinant of the matrix $\mathbf{A}^2 - \mathbf{AB}$ is equal to $3k + 28$

Find the value of k.

$k =$ .....

(Total for Question 26 is 6 marks)

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

27

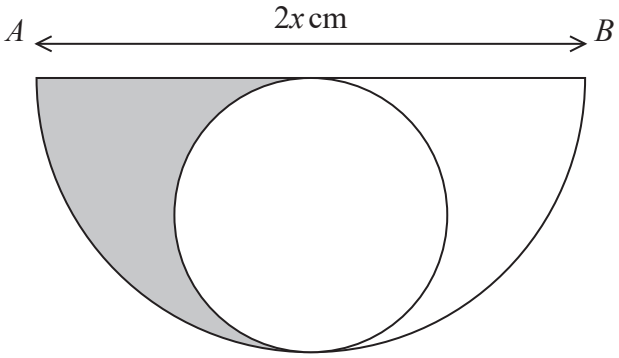

Diagram **NOT** accurately drawn

The diagram shows a semicircle, with diameter AB, where $AB = 2x$ cm.

The diagram also shows a circle, which is the circle with the greatest possible radius that can be drawn inside the semicircle.

The perimeter of the shaded region is P cm and the area of the shaded region is A cm^2.

Given that $P = A$, find an expression for x in terms of π.

$x =$ .....

(Total for Question 27 is 6 marks)

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

$$x = -3t^3 + 6t^2 + kt + 4 \qquad t \geqslant 0$$

At time t seconds, the velocity of P is v m/s such that $v = 9$ when $t = 2$

(a) Show that $k = 21$

(3)

Particle P comes to instantaneous rest at the point A.

(b) Using $k = 21$, find the value of t when P is at A.

$t =$ .....

(3)

(c) Find, to the nearest metre, the distance OA.

.....m

(2)

(Total for Question 28 is 8 marks)

TOTAL FOR PAPER IS 100 MARKS

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