Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel International GCSE

Tuesday 14 May 2024

Afternoon (Time: 1 hour 30 minutes)

Paper reference **4MB1/01**

Mathematics B

PAPER 1

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of 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 7 6 5 0 2 A 0 1 2 4

Pearson

Answer ALL TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Write 7432 to 2 significant figures.

.....

(1)

(b) Write 0.0374 to 2 decimal places.

.....

(1)

(Total for Question 1 is 2 marks)

2 Given that $k = 7$ find the value of $\frac{3 - 2k^2}{2} + 5k$

.....

(Total for Question 2 is 2 marks)

3

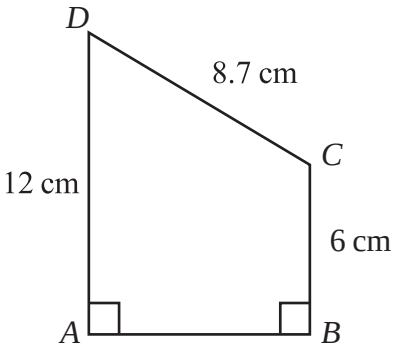


Diagram **NOT** accurately drawn

The diagram shows trapezium $ABCD$

$\angle ABC = \angle BAD = 90°$ $AD = 12\,\text{cm}$ $CD = 8.7\,\text{cm}$ $BC = 6\,\text{cm}$

Calculate the area, in cm^2, of trapezium $ABCD$

..... cm^2

(Total for Question 3 is 3 marks)

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

(a) Calculate $\mathbf{A} + \mathbf{B}$

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

(1)

Given that $n\mathbf{A} - 2\mathbf{B} = \begin{pmatrix} 13 & 2 \\ -7 & -1 \end{pmatrix}$

(b) find the value of n

$n =$ .....

(2)

(Total for Question 4 is 3 marks)

5 A straight line passes through the points with coordinates (2, –14) and (–3, 6)

Find an equation of the line.
Give your answer in the form $y = mx + c$

.....

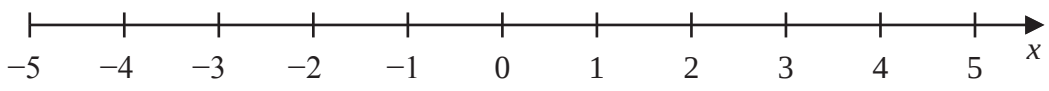
(Total for Question 5 is 3 marks)

6 (a) Solve the inequality $3w - 4 \leqslant 8w + 11$

.....

(2)

(b) On the number line, show the inequality $-4 < x \leqslant 2$



(2)

(Total for Question 6 is 4 marks)

7 (a) Simplify fully $\left(3a^3b^5\right)^2$

.....

(2)

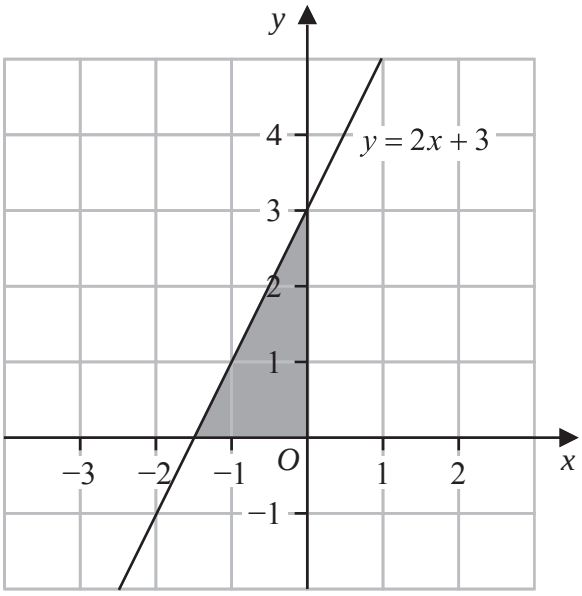
(b) Simplify fully $\left(4c\right)^{-\frac{1}{2}}$

.....

(1)

(Total for Question 7 is 3 marks)

8



The diagram shows the line $y = 2x + 3$

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

.....

.....

.....

(Total for Question 8 is 2 marks)

9

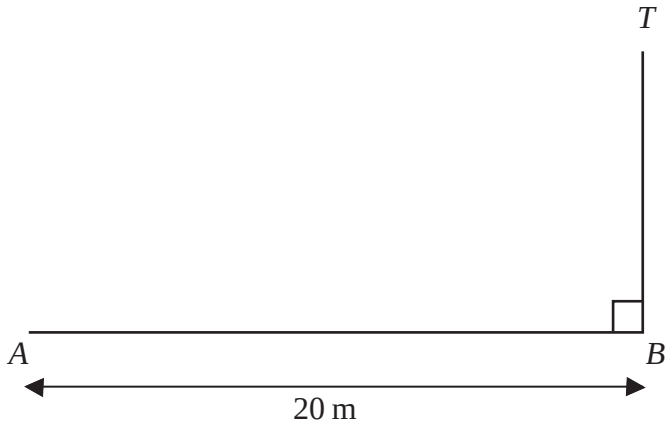


Diagram **NOT** accurately drawn

A and *B* are two points on horizontal ground.

The distance from *A* to *B* is 20 m
BT is a vertical pole.
The angle of depression of *A* from *T* is 10°

Find the height, in metres to 3 significant figures, of the pole.

..... m

(Total for Question 9 is 3 marks)

10

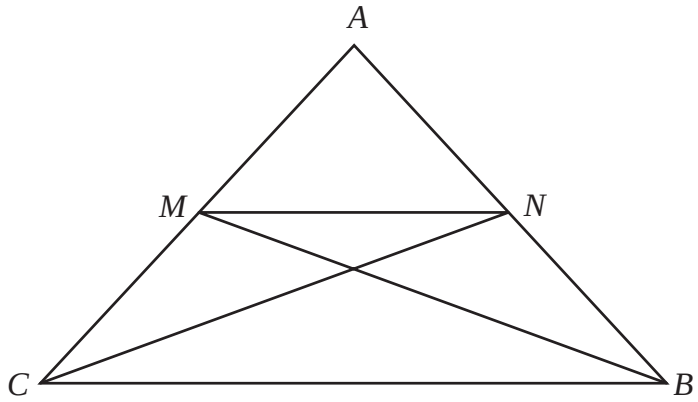


Diagram **NOT** accurately drawn

The diagram shows the isosceles triangle ABC where $AC = AB$

M is the midpoint of AC
N is the midpoint of AB

Prove that triangle MCB is congruent to triangle NBC

(Total for Question 10 is 3 marks)

11 $\mathbf{A} = \begin{pmatrix} 3 & -2 \\ -5 & 1 \end{pmatrix}$

Find $\mathbf{A}^{-1}$

.....

(Total for Question 11 is 2 marks)

12 Make x the subject of $x + 3 = \dfrac{4(x-1)}{y}$

.....

(Total for Question 12 is 3 marks)

13

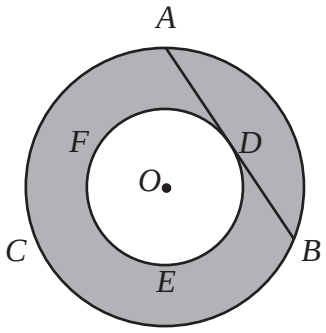


Diagram **NOT** accurately drawn

The diagram shows the circle ABC with centre O and the circle DEF with centre O

The line ADB is a tangent to the circle DEF at the point D

$AB = 16\,\text{cm}$

Showing your working, calculate in cm^2, the shaded area of the diagram.
Give your answer in terms of π

..... cm^2

(Total for Question 13 is 3 marks)

14 (a) Find the Highest Common Factor (HCF) of 90, 132 and 432
Show your working clearly.

.....

(2)

Lali thinks of two numbers.

The Highest Common Factor (HCF) of the two numbers is 28
The Lowest Common Multiple (LCM) of the two numbers is a multiple of 35

(b) Find the **two smallest** numbers that Lali could be thinking of.

..... , ...

(2)

(Total for Question 14 is 4 marks)

15 (a) Factorise fully $6a + 24ab$

.....

(2)

(b) Factorise fully $x^2 - 7x + 12$

.....

(2)

(Total for Question 15 is 4 marks)

16 Without using a calculator and showing all your working, evaluate

$$\frac{1}{6} + \left(1\frac{7}{8} \times 2\frac{4}{5}\right)$$

Give your answer as a mixed number in its simplest form.

.....

(Total for Question 16 is 4 marks)

17 Jay has 8 red apples and 10 green apples.

The total weight of all 18 apples is 2394 g
Jay eats one of the green apples weighing 148 g
The mean weight of the 9 remaining green apples is 154 g

Calculate the mean weight of the 8 **red** apples.

..... g

(Total for Question 17 is 4 marks)

18 A regular polygon has n sides.

Each interior angle of the regular polygon is $2x°$

Each exterior angle of the regular polygon is $\left(\frac{x - 54}{2}\right)°$

Find the value of n

$n =$ .....

(Total for Question 18 is 4 marks)

19 y varies inversely as the cube root of x

$y = 6$ when $x = 3.375$

Find the value of y when $x = 64$

$y =$ .....

(Total for Question 19 is 3 marks)

20 Without using a calculator, show that $\dfrac{\left(\sqrt{27} + \sqrt{3}\right)^2}{\sqrt{45} + 3}$ can be written in the form $a\sqrt{b} - a$

where a and b are integers.
Show your working clearly.

(Total for Question 20 is 4 marks)

21 Car A travelled x km at an average speed of a km/h
Car B travelled y km at an average speed of b km/h

Given that

$x = 110$ to 2 significant figures
$a = 90$ to 1 significant figure
$y = 35$ to 2 significant figures
$b = 60$ to 1 significant figure

calculate the upper bound, in hours to 3 decimal places, for

(Time taken for car A to travel the x km) – (Time taken for car B to travel the y km)

Show your working clearly.

..... hours

(Total for Question 21 is 4 marks)

22 Express $\left(\frac{2}{3x-2}-\frac{3}{x+4}\right)\div\frac{7x-14}{12x^2+7x-10}$ as a single fraction in its simplest form.
Show clear algebraic working.

.....

(Total for Question 22 is 4 marks)

23 The table below gives some information about the distance travelled to work, in km, each day by 60 people.

Distance (d km)	**Frequency**
$0 < d \leqslant 2$	22
$2 < d \leqslant 5$	13
$5 < d \leqslant 10$	9
$10 < d \leqslant 20$	12
$20 < d \leqslant 40$	4

(a) Write down the modal class.

.....

(1)

(b) Find the class that contains the median distance travelled to work.

.....

(1)

(c) Calculate an estimate, in km, for the mean distance travelled to work.

..... km

(4)

One of the 60 people is selected at random.

(d) Find the probability that the distance this person travelled to work is more than 10 km.

.....

(1)

(Total for Question 23 is 7 marks)

24 *A* and *B* are two mathematically similar containers.

Container *A* has a volume of 30 000 mm^3 and container *B* has a volume of 6480 mm^3

Given that

surface area of container *A* + surface area of container *B* = 8432 mm^2

calculate the surface area, in mm^2, of container *B*

..... mm^2

(Total for Question 24 is 5 marks)

25

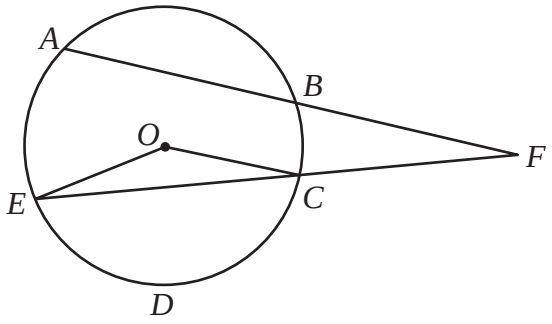


Diagram **NOT** accurately drawn

The diagram shows circle $ABCDE$ with centre O

ABF and ECF are straight lines.

$OE = 10\,\text{cm}$ $BF = 15\,\text{cm}$ $AB = (x + 1)\,\text{cm}$ $CF = x\,\text{cm}$

The area of the sector $OCDE = 40\pi\,\text{cm}^2$

Find the value, to one decimal place, of x

$x =$ .....

(Total for Question 25 is 6 marks)

Turn over for Question 26

26

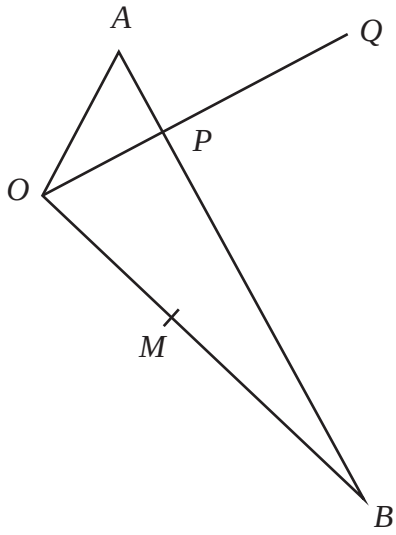


Diagram **NOT** accurately drawn

OAB is a triangle.

The point *P* lies on *AB* such that *OPQ* is a straight line.

The point *M* lies on *OB* such that $OM : MB = 2 : 3$

$\overrightarrow{OA} = 3\mathbf{a}$ $\overrightarrow{OB} = 5\mathbf{b}$ $\overrightarrow{BQ} = 6\mathbf{a} - 3\mathbf{b}$

(a) Find, in terms of **a** and **b**, simplifying your answer where possible

(i) $\overrightarrow{AB}$

$\overrightarrow{AB} =$ .....

(1)

(ii) $\overrightarrow{OQ}$

$\overrightarrow{OQ} =$ .....

(1)

(b) Using a vector method and your answers from part (a) find $\overrightarrow{MP}$
Simplify your answer.

(4)

$\overrightarrow{MP} =$ .....

(Total for Question 26 is 6 marks)

Turn over for Question 27

27 The equation of a curve is $y = a + bx^{-1} - 9x^{-2}$ where a and b are constants.

The maximum point on this curve is (3, 4.4)

Find the value of a

$a =$ .....

(Total for Question 27 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS