Write your name here

Surname	Other names

Edexcel
International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics B

Paper 1

Friday 10 May 2013 – 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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6/6/6/6/4/

P 4 2 0 6 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 For his mathematics examination Jonas buys a calculator for £9.95, a protractor for £0.65, a ruler for £0.45 and 5 pencils at £0.15 each. He pays with a £20 note. Calculate the change he should get.

£ .....

(Total for Question 1 is 2 marks)

2

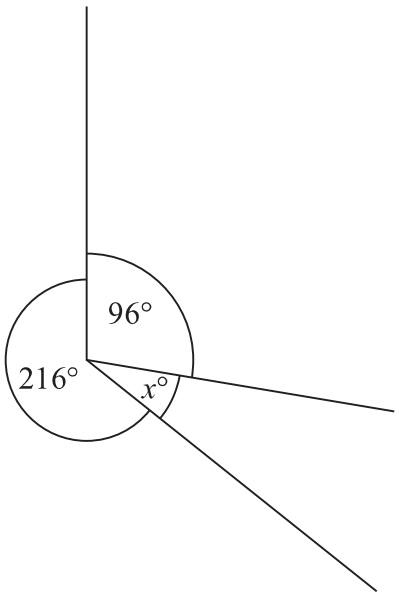

Diagram **NOT** accurately drawn

In the diagram, the three straight lines meet at a point. Find the value of x.

x = ...

(Total for Question 2 is 2 marks)

3 Write 18 cm as a percentage of 450 cm.

..... %

(Total for Question 3 is 2 marks)

4 The point B is the image of the point $A(3, -2)$ after a reflection in the line with equation $y = 1$

Find the coordinates of B.

(....., ...)

(Total for Question 4 is 2 marks)

5 (a) Write down the number of lines of symmetry of a regular pentagon.

.....

(1)

(b) Write down the order of rotational symmetry of a square.

.....

(1)

(Total for Question 5 is 2 marks)

6 The graph of the line with equation $2x + y = 12$ meets the x-axis at (a, b).

Find the value of a and the value of b.

$a =$ .....

$b =$ .....

(Total for Question 6 is 2 marks)

7 x is an integer and $3x + 13 > -12$

Find the smallest value of x.

.....

(Total for Question 7 is 2 marks)

8 $(x + 3)$ is a factor of $2x^3 + x^2 + kx + 6$

Find the value of k.

$k =$ .....

(Total for Question 8 is 2 marks)

9 Evaluate $\begin{pmatrix} 3 & 2 & 1 \\ 2 & -1 & 4 \\ 3 & -2 & -3 \end{pmatrix}\begin{pmatrix} 3 \\ 2 \\ 1 \end{pmatrix}$

(Total for Question 9 is 2 marks)

10 Express $\dfrac{x}{x^2-1} - \dfrac{1}{x+1}$ as a single fraction.

Give your answer in its simplest form.

.....

(Total for Question 10 is 3 marks)

11 Showing all your working, find the exact value of $\dfrac{2\sqrt{75} - 4\sqrt{3}}{\sqrt{12}}$

.....

(Total for Question 11 is 3 marks)

12 $\mathscr{E}$ = { positive integers < 12 },

A = { prime numbers },

B = { odd numbers }.

Find

(a) $A \cap B$

$A \cap B = \{$.....$\}$

(1)

(b) $A \cup B$

$A \cup B = \{$.....$\}$

(1)

(c) $n((A \cup B)')$

$n((A \cup B)') =$ .....

(1)

(Total for Question 12 is 3 marks)

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13 The vectors **x**, **a** and **b** are such that $5\mathbf{x} + 3\mathbf{a} = 4\mathbf{b}$. Given that $\mathbf{a} = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$ and that $\mathbf{b} = \begin{pmatrix} 7 \\ 1 \end{pmatrix}$, find the column vector **x**.

$\mathbf{x} = \begin{pmatrix} \\ \end{pmatrix}$

(Total for Question 13 is 3 marks)

14

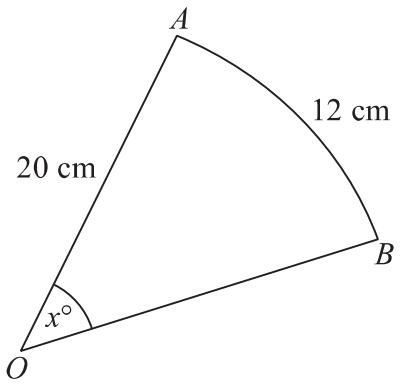


Diagram **NOT** accurately drawn

AB is an arc of length 12 cm of a circle centre *O*. The radius of the circle is 20 cm.
Calculate the value of *x*.

$x =$ .....

(Total for Question 14 is 3 marks)

15 A rectangular garden has length $(2x - 3)$ metres and width $(3x + 7)$ metres.

(a) Explain why $x > 1.5$

.....

.....

(1)

The perimeter of the garden is *P* metres.

(b) Write down and simplify an expression in *x* for *P*.

$P =$ .....

(2)

(Total for Question 15 is 3 marks)

16 The heights of two similar solids are in the ratio 5 : 2

The volume of the larger solid is 500 cm^3.

Find the volume of the smaller solid.

..... cm^3

(Total for Question 16 is 3 marks)

17 There are some oranges in a box. The total weight of these oranges is 4.29 kg. The mean weight of these oranges is 97.5 g. Calculate the number of oranges in the box.

.....

(Total for Question 17 is 3 marks)

18 $$\frac{1}{f}+\frac{1}{g}=\frac{1}{h}$$

Find h in terms of f and g. Simplify your answer.

$h =$ .....

(Total for Question 18 is 3 marks)

19 Evaluate $\dfrac{1.2\times10^{11}}{8\times10^{-2}}$ giving your answer in standard form.

.....

(Total for Question 19 is 3 marks)

20 (a) Express 504 as a product of its prime factors.

.....

(2)

(b) Write down the smallest positive integer by which 504 must be multiplied to give a perfect square.

.....

(1)

(Total for Question 20 is 3 marks)

21

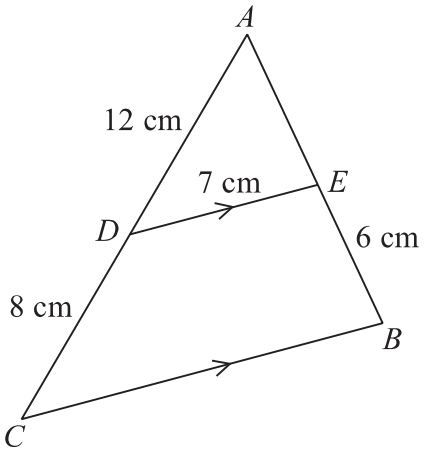


Diagram **NOT** accurately drawn

ABC is a triangle. The point *D* on *CA* and the point *E* on *BA* are such that *DE* is parallel to *CB*. Given that *AD* = 12 cm, *DC* = 8 cm, *EB* = 6 cm and *DE* = 7 cm, find the length, in cm, of

(a) *AE*,

AE = ... cm

(2)

(b) *CB*.

CB = ... cm

(2)

(Total for Question 21 is 4 marks)

22 There are only red and blue counters in a bag. When a counter is taken at random from the bag, the probability that the counter is blue is $\frac{2}{5}$

Given that there are 60 counters in the bag,

(a) find the number of blue counters in the bag.

.....

(2)

Some more blue counters are added to the 60 counters already in the bag.

The number of extra blue counters added is x.

When a counter is now taken at random from the bag, the probability that the counter is blue is $\frac{1}{2}$

(b) Find the value of x.

$x =$ .....

(2)

(Total for Question 22 is 4 marks)

23 (a) Expand $(x - 3)(x^2 - 2)$

.....

(2)

Given that $y = (x - 3)(x^2 - 2)$

(b) find $\frac{dy}{dx}$

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

(3)

(Total for Question 23 is 5 marks)

24 $f : x \mapsto x^2 - 6x + 4$

Find the values of x which satisfy $f(x) = 11$

.....

(Total for Question 24 is 5 marks)

25

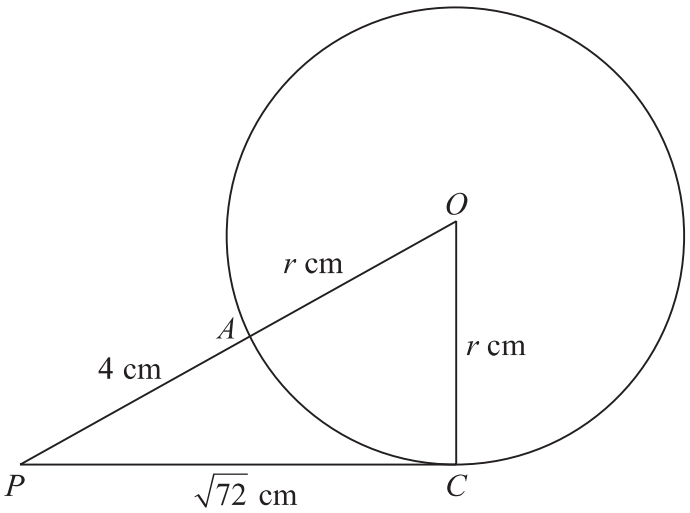


Diagram **NOT** accurately drawn

A and C are two points on the circumference of a circle centre O and radius r cm.
The point P is such that PC is a tangent to the circle and PAO is a straight line.

Given that $PC = \sqrt{72}$ cm and $PA = 4$ cm,

(a) use this information to write down an equation in r.

.....

(1)

(b) Find the value of r.

$r =$ .....

(2)

(c) Find the size, in degrees to 3 significant figures, of $\angle OPC$.

$\angle OPC =$ ..... °

(2)

(Total for Question 25 is 5 marks)

26 A pie chart is to be drawn for the surface areas, in 1000 km^2, of the five Great Lakes in North America. Here is an incomplete table for this information.

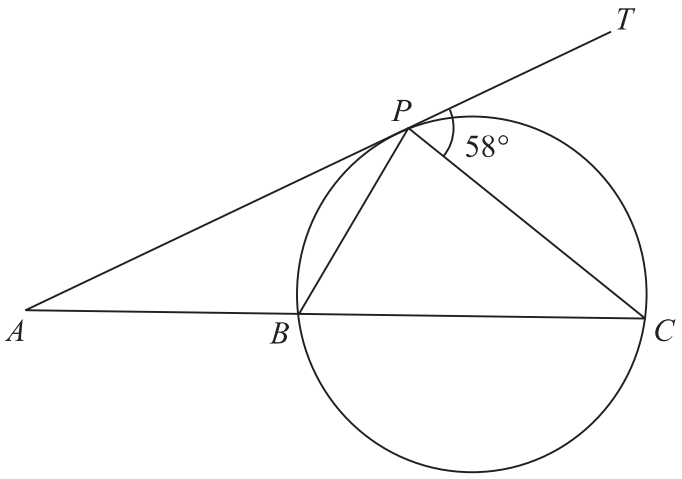
Lake	**Area in 1000 km^2 (to nearest thousand)**	**Angle at centre of the pie chart**
Superior	82	
Huron	59	
Michigan	58	87°
Erie		36°
Ontario		

Complete the table.

(Total for Question 26 is 6 marks)

27

Diagram **NOT** accurately drawn



B, P and C are three points on a circle with diameter BC. The line APT is a tangent to the circle, ABC is a straight line and $\angle TPC = 58°$.

Giving your reasons, find the size, in degrees, of

(a) $\angle PCB$,

$\angle PCB$ = ... °

(3)

(b) $\angle PAB$.

$\angle PAB$ = ... °

(3)

(Total for Question 27 is 6 marks)

28 A particle, P, is moving along a straight line. At time t seconds, the distance s metres of P from a fixed point O of the line is given by $s = kt^2 - 6t + 3$ where k is a constant and $t \geqslant 0$

Given that at $t = 1$, P is momentarily at rest,

(a) find the value of k.

$k =$ .....

(4)

(b) Find the distance moved in the 3rd second.

..... m

(3)

(Total for Question 28 is 7 marks)

29

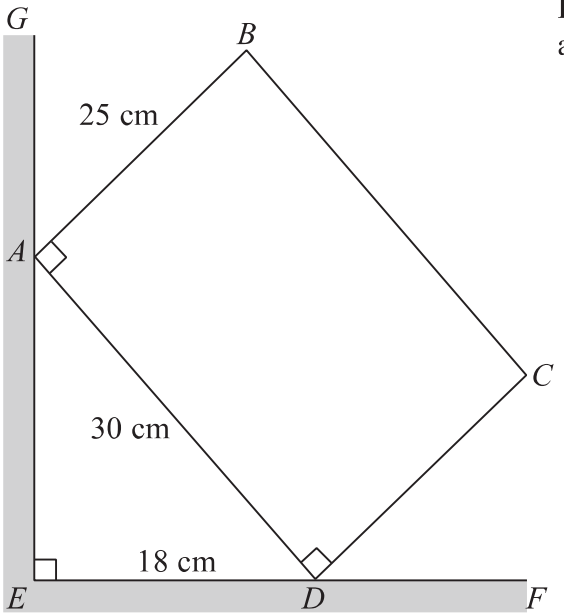


Diagram **NOT** accurately drawn

In the diagram $ABCD$ is a rectangular cross-section of a block of wood resting against a vertical wall GAE with $\angle BAD = \angle ADC = 90°$. The floor, EDF, is horizontal.
$AD = 30$ cm, $AB = 25$ cm and $ED = 18$ cm.

(a) Show that the length of AE is 24 cm.

(1)

Find

(b) the size, in degrees, to 3 significant figures, of $\angle BAG$,

$\angle BAG =$ ..... °

(3)

(c) the height, in cm, of B above the floor.

..... cm

(3)

(Total for Question 29 is 7 marks)

TOTAL FOR PAPER IS 100 MARKS

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