Write your name here

Surname		Other names

Edexcel International GCSE

Centre Number

Candidate Number

Mathematics B
Paper 1

Friday 11 May 2012 – Afternoon
Time: 1 hour 30 minutes

Paper Reference
4MB0/01

Total Marks

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

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 ▶

PEARSON

Answer ALL THIRTY questions.

Write your answers in the spaces provided.
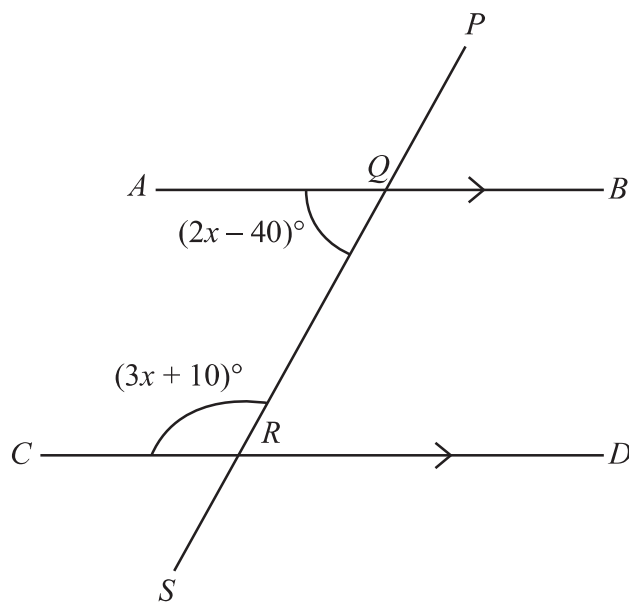
You must write down all stages in your working.

1 Tickets for a show are priced at £12.50 for an adult ticket and £7.20 for a child ticket.
Find the total cost, in £, for 5 adult tickets and 4 child tickets.

£ ....

(Total for Question 1 is 2 marks)

2

Diagram **NOT**
accurately drawn

In the diagram *AQB* is parallel to *CRD* and *PQRS* is a straight line. Find the value of *x*.

x = ...

(Total for Question 2 is 2 marks)

3 Solve the equation $5 - \sqrt{x} = \sqrt{x} - 7$

....

(Total for Question 3 is 2 marks)

4 The bearing of ship A from ship B is 145°

Calculate the bearing of ship B from ship A.

....°

(Total for Question 4 is 2 marks)

5 A clock loses 3 minutes every day.

Find the number of seconds the clock loses every hour.

....

(Total for Question 5 is 2 marks)

6 Expand and simplify $(2x-3)(3x-2)$

....

(Total for Question 6 is 2 marks)

7 Showing your working clearly, find the Highest Common Factor (HCF) of 72, 162, 270

....

(Total for Question 7 is 2 marks)

8 $\mathbf{a} = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$

Find $\mathbf{a} - 2\mathbf{b}$

$\mathbf{a} - 2\mathbf{b} = \begin{pmatrix} \\ \end{pmatrix}$

(Total for Question 8 is 2 marks)

9 A sheet of gold leaf is 1.25×10^{-5} cm thick. Find the total thickness of 6000 of these sheets. Give your answer in cm and in standard form.

....

(Total for Question 9 is 2 marks)

10 Evaluate $\sqrt{(125^{\frac{2}{3}} - 81^{\frac{1}{2}})}$

....

(Total for Question 10 is 2 marks)

11 Factorise completely $27x^2 - 12y^2$

....

(Total for Question 11 is 3 marks)

12 A competition consists of 5 rounds. In each round, the number of matches played is $4n + 1$, where n is the number of the round.

(a) Write down the number of matches played in the 5th round.

....

(1)

(b) Calculate the total number of matches played in all 5 rounds.

....

(2)

(Total for Question 12 is 3 marks)

13 A fuel tank on a car contains 68 litres of fuel when full. At the start of a journey, the fuel tank is full. When the car has travelled 612 km, the fuel tank is a quarter full.
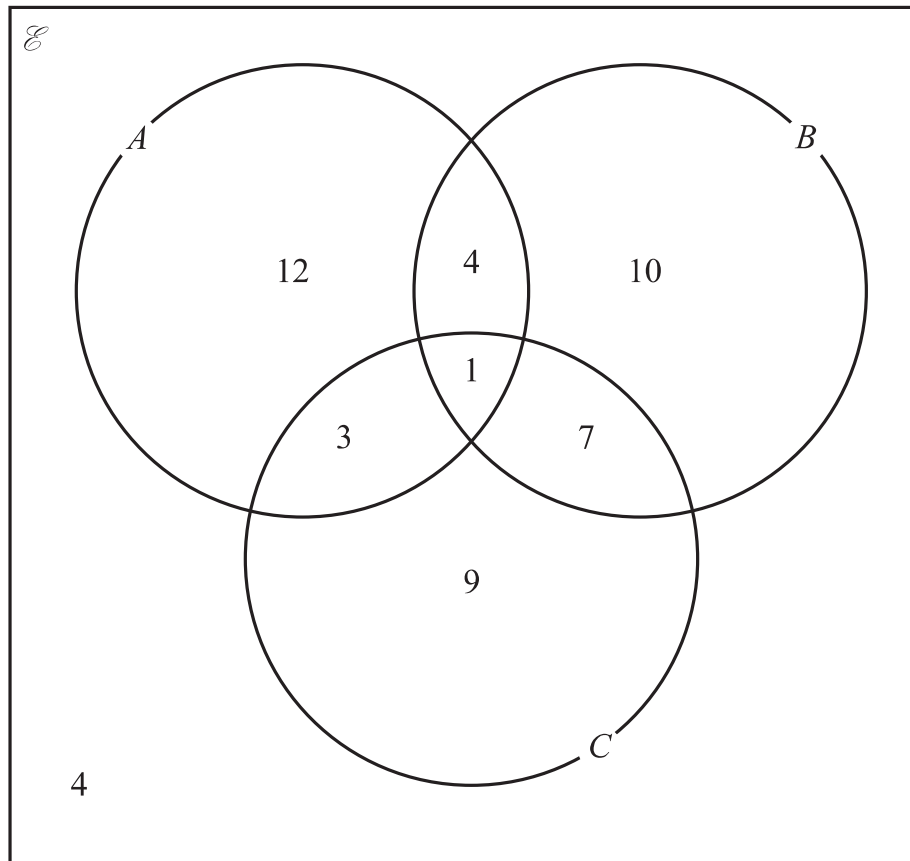
Find the number of kilometres travelled per litre of fuel.

.... km

(Total for Question 13 is 3 marks)

14

The numbers in the diagram give the number of elements in the relevant subset.

Find

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

....

(1)

(b) $n(A \cup B \cup C)$

....

(1)

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

....

(1)

(Total for Question 14 is 3 marks)

15 A plot of land is for sale at £24 000. A group of *x* people decides to buy the land and each person in the group is to pay the same amount of money, £*A*.

(a) Write down a formula for *A* in terms of *x*.

A = ...

(1)

Given that each person pays £1500,

(b) find the number of people in the group.

....

(2)

(Total for Question 15 is 3 marks)

16 (a) Write down the number of lines of symmetry of a regular hexagon.

....

(1)

Each exterior angle of a regular polygon is 30°.

(b) Find the order of rotational symmetry of this polygon.

....

(2)

(Total for Question 16 is 3 marks)

17 Find the largest integer which satisfies $5x - 2 < 3(5 - x)$

....

(Total for Question 17 is 3 marks)

18 Triangle ABC is a right-angled triangle with $\angle ABC = 90°$

Given that $\sin \angle BAC = \dfrac{8}{17}$, find the value of $\tan \angle BAC$ as a fraction.

....

(Total for Question 18 is 3 marks)

19 $\begin{pmatrix} 1 & -1 \\ 2 & 1 \end{pmatrix} \begin{pmatrix} 1 & a \\ b & 1 \end{pmatrix} = \lambda \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

Find the values of a, b and λ.

$a = $ ....

$b = $ ....

$\lambda = $ ....

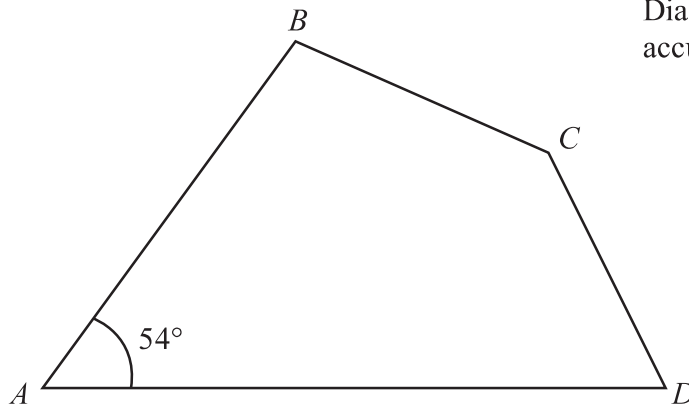**(Total for Question 19 is 3 marks)**

20

Diagram **NOT** accurately drawn

The diagram shows a quadrilateral *ABCD* in which $\angle A = 54°$
The sizes of the other three interior angles *B*, *C* and *D* are in the ratio 6 : 7 : 4

(a) Calculate the size, in degrees, of the largest angle.

....

(3)

(b) Give the geometrical name for the quadrilateral *ABCD*.

....

(1)

(Total for Question 20 is 4 marks)

21 In the summer of 2010, 14% of candidates who sat an examination obtained an A* grade. Given that 15 000 candidates sat the examination,

(a) calculate the number of candidates who obtained an A* grade.

....

(2)

In the summer of 2011, the same number of candidates obtained an A* grade. This was 16% of the total number of candidates who sat the examination.

(b) Calculate the number of candidates who sat the examination in the summer of 2011.

....

(2)

(Total for Question 21 is 4 marks)

22 Given that y varies inversely as the square of x and that $y = \dfrac{1}{24}$ when $x = 60$, find the value of y when $x = 10$.

$y =$ ....

(Total for Question 22 is 4 marks)

23 Two similar containers have volumes 0.25 litres and 16 litres. The larger container has a base radius of 24 cm. Calculate the base radius, in cm, of the smaller container.

.... cm

(Total for Question 23 is 4 marks)

24 The velocity v m/s of a point moving in a straight line at time t seconds is given by

$$v = 4t^3 - t^2 - 2t , \quad t \geqslant 0$$

(a) Write down the value of v when $t = 3$

$v = $ ....
(1)

(b) Find an expression for the acceleration, in m/s^2, of the point.

....
(3)

(Total for Question 24 is 4 marks)

25

A _____ B

(rectangle ABCD)

D _____ C

ABCD is a rectangle.

Leaving in all your construction lines, construct the locus of all points inside the rectangle which are

(a) equidistant from *D* and *C*,

(2)

(b) equidistant from the lines *AD* and *DC*.

(2)

The region *R* consists of all the points inside the rectangle which are closer to *C* than to *D* and closer to *AD* than to *DC*.

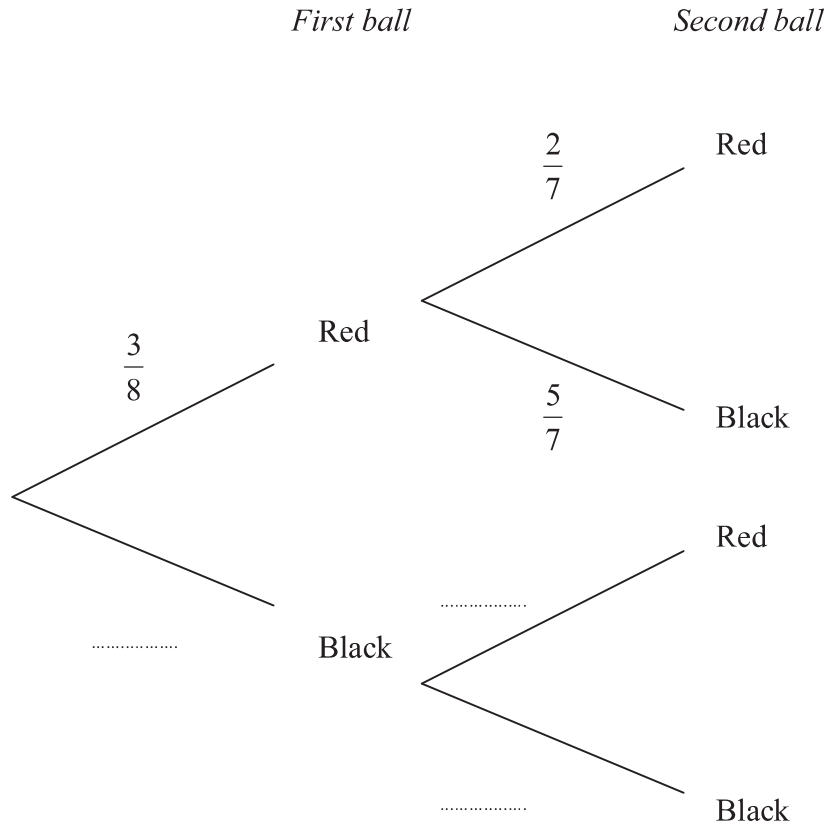(c) Show by shading the region *R*. Label the region *R*.

(1)

(Total for Question 25 is 5 marks)

26 A bag contains 3 red balls and 5 black balls. Two balls are to be taken at random, without replacement, from the bag.

(a) Complete the probability tree diagram.

First ball   Second ball

$\frac{3}{8}$ Red

$\frac{2}{7}$ Red

$\frac{5}{7}$ Black

Black

.... Red

.... Black

(3)

(b) Find the probability that the two balls taken are of the same colour.

....

(2)

(Total for Question 26 is 5 marks)
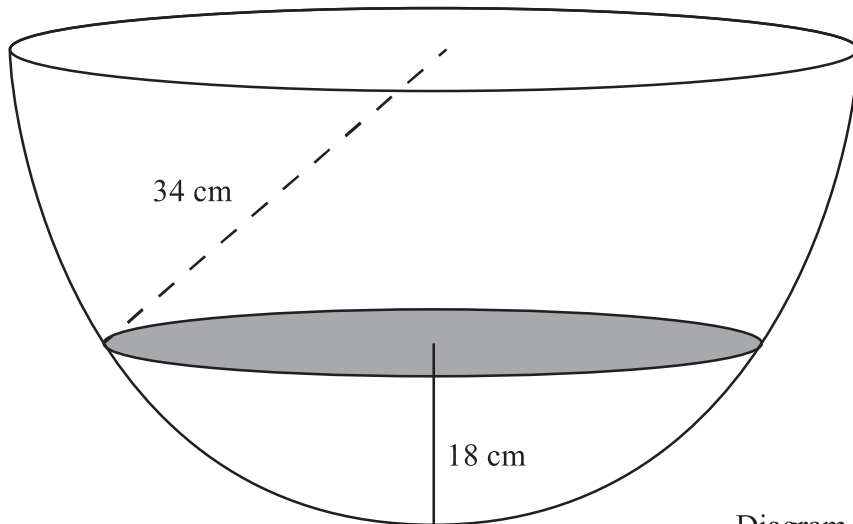
27

34 cm

18 cm

Diagram **NOT**
accurately drawn

A hemispherical bowl of radius 34 cm contains water to a depth of 18 cm.
Calculate the area, in cm^2 to 3 significant figures, of the surface of the water.

.... cm^2

(Total for Question 27 is 5 marks)

28 Solve $\dfrac{2}{2x-1}+\dfrac{3}{x}=3$

....

(Total for Question 28 is 5 marks)

29 An international courier company delivers parcels around the world. The table gives information about the weights of 80 parcels delivered one day.

Weight (x kg)	$0 < x \leqslant 2$	$2 < x \leqslant 4$	$4 < x \leqslant 6$	$6 < x \leqslant 8$	$8 < x \leqslant 10$
Frequency	35	20	13	8	4

(a) Write down the modal class for this information.

....
(1)

Calculate an estimate for

(b) the mean weight of the 80 parcels,

....
(3)

(c) the median weight of the 80 parcels.

....
(2)

(Total for Question 29 is 6 marks)

30 A curve C has equation $y = x^3 - x^2$

Find

(a) $\dfrac{\mathrm{d}y}{\mathrm{d}x}$,

$$\dfrac{\mathrm{d}y}{\mathrm{d}x} = \text{..}$$

(2)

(b) the x-coordinates of each point on C at which the tangent is parallel to $y = 5x$.

....

(5)

(Total for Question 30 is 7 marks)

TOTAL FOR PAPER IS 100 MARKS

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