Write your name here

Surname		Other names

Edexcel GCSE

Centre Number   Candidate Number

Methods in Mathematics
Unit 1: Methods 1
For Approved Pilot Centres ONLY

Higher Tier

Monday 13 June 2011 – Afternoon	Paper Reference
Time: 1 hour 45 minutes	**5MM1H/01**

You must have:
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser. 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 must not 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*.
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression*.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
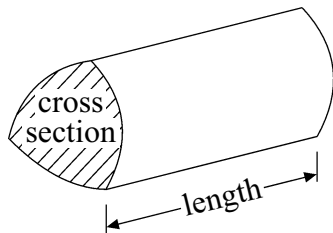- Check your answers if you have time at the end.
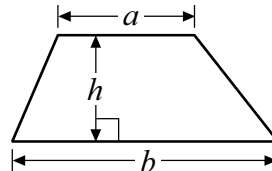
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You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.
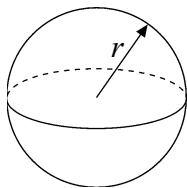
Volume of a prism = area of cross section × length

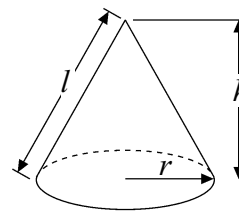**Area of trapezium** = $\frac{1}{2}(a + b)h$

Volume of sphere = $\frac{4}{3}\pi r^3$
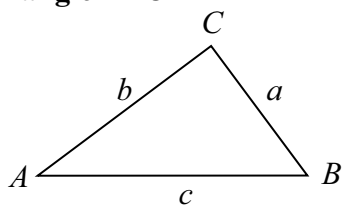
Surface area of sphere = $4\pi r^2$

Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$

In any triangle *ABC*

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Sine Rule $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2}ab \sin C$

Answer ALL Twenty Four questions.

Write down your answers in the spaces provided.

You must NOT use a calculator.

You must write down all stages of your working.

1   There are 20 counters in a box.

5 counters are red.
4 counters are green.
The rest of the counters are blue.

Hajra takes at random one of the counters from the box.

What is the probability that she takes

(i) a blue counter,

....

(ii) A counter that is not green?

....

(Total for Question 1 is 4 marks)

2   Work out 374×53

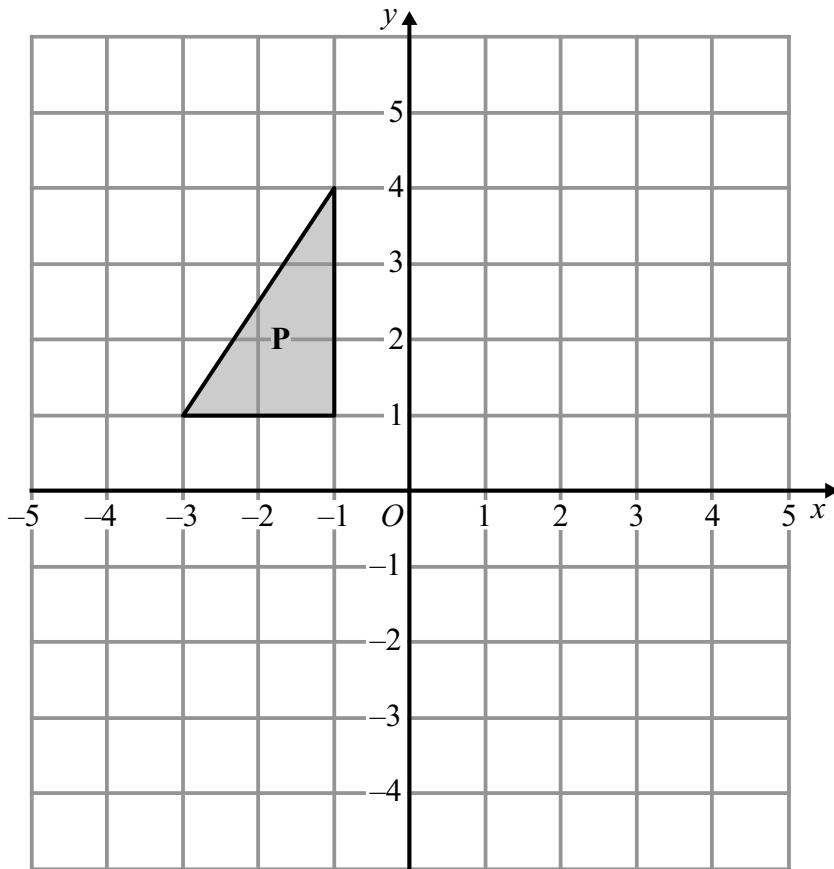...

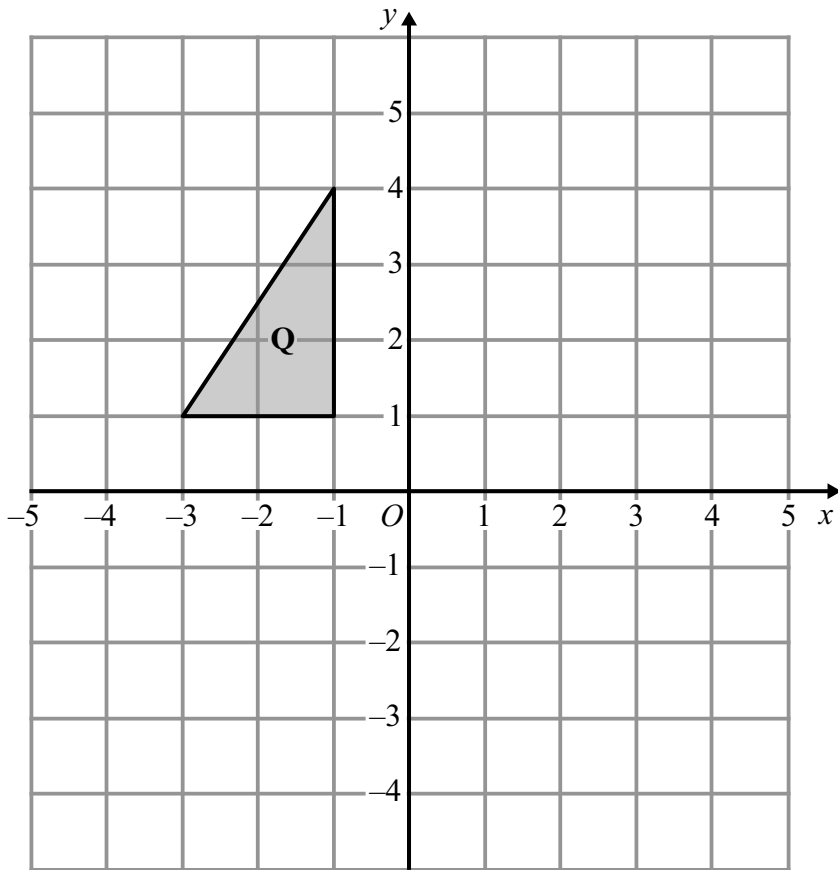**(Total for Question 2 is 3 marks)**

3

(a) Translate triangle **P** by vector $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$

(2)

(b) Rotate triangle **Q** 180° centre (0, 2).

(2)

(Total for Question 3 is 4 marks)

4 Work out $1\dfrac{1}{5} + 3\dfrac{7}{10}$

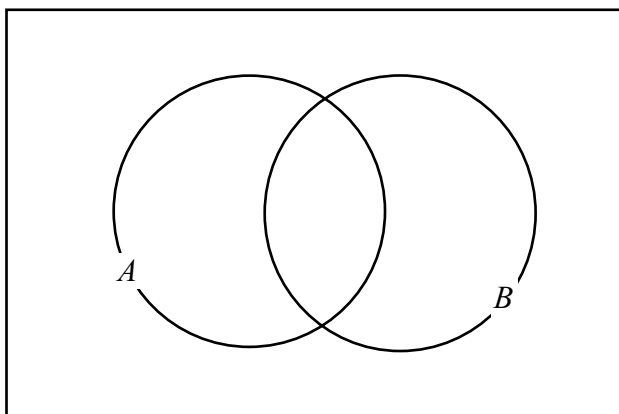...

(Total for Question 4 is 3 marks)

5 The universal set $\mathscr{E} = \{11, 12, 13, 14, 15, 16, 17, 18, 19\}$

Set $A = \{12, 15, 18\}$
Set $B = \{12, 14, 16, 18\}$

(a) Complete the Venn diagram.

(2)

(b) Write down the numbers that are in both set A and set B.

$A \cap B = $ ....

(1)

(c) Write down the numbers that are in the set $A \cup B$.

$A \cup B = $ ....

(1)

(d) Write down the numbers that are in set A'.

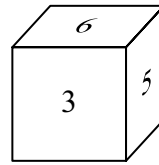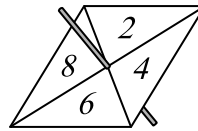$A' = $ ....

(1)

(Total for Question 5 is 5 marks)

6 Jim has a fair 4-sided spinner numbered 2, 4, 6 and 8
and a fair 6-sided dice.

He spins the spinner once and rolls the dice once.
To get the score he **multiplies** the numbers together.

(i) Work out the probability the score will be 2

....

(ii) Work out the probability the score will be more than 30

....

(Total for Question 6 is 5 marks)

7 (a) Find the Highest Common Factor (HCF) of 12 and 20

....

(2)

(b) Find the Lowest Common Multiple (LCM) of 32 and 48

....

(2)

(Total for Question 7 is 4 marks)

8 (a) Expand and simplify $2(x + 3y) + 4(x - y)$

....

(2)

(b) Factorise completely $8p - 12pq$

....

(2)

(Total for Question 8 is 4 marks)

*9
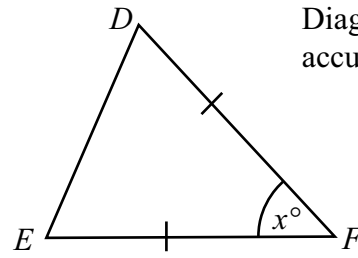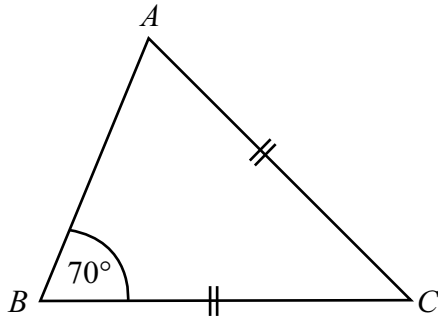
Triangle *ABC* is an isosceles triangle.
Angle *B* = 70°.
AC = *BC*.

Triangle *ABC* is similar to triangle *DEF*.

Find the value of the angle marked *x*°.
Give reasons for your answer.

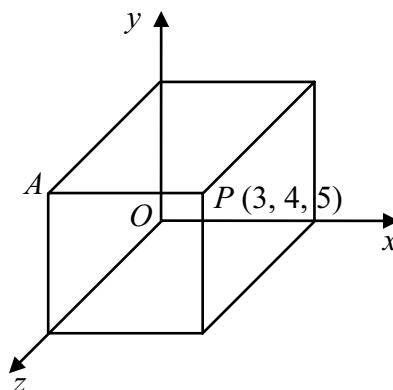**(Total for Question 9 is 4 marks)**

10 A cuboid is shown on a 3-D grid.

Diagram **NOT**
accurately drawn

The point *P* has coordinates (3, 4, 5).
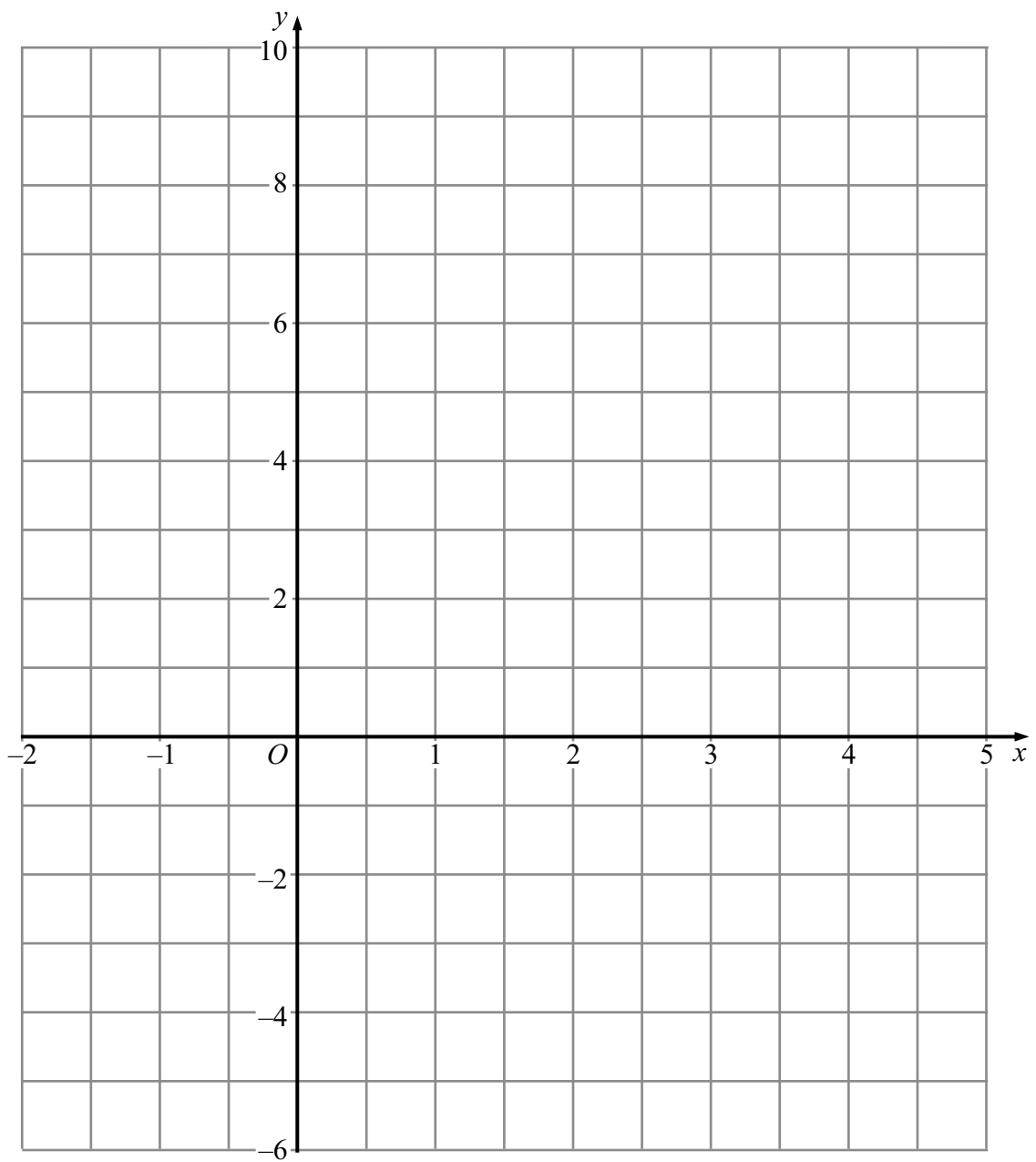
Write down the coordinates of the point *A*.

....

(Total for Question 10 is 2 marks)

11 On the grid draw the graph of $y = 2x - 3$

(Total for Question 11 is 3 marks)

12 (a) Write down the value of 25^0

....
(1)

(b) Write down the value of $49^{-\frac{1}{2}}$

....
(1)

(c) Write as a power of 2 $\dfrac{4 \times 8}{16^3}$

....
(3)

(Total for Question 12 is 5 marks)

13 (a) Write in standard form 96 000 000

....
(1)

(b) Write as an ordinary number 1.2×10^{-3}

....
(1)

(c) Work out $3.2 \times 10^{-4} \times 5 \times 10^8$

Give your answer in standard form.

....
(2)

(Total for Question 13 is 4 marks)
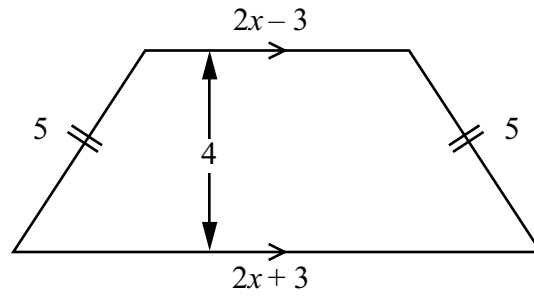
14 Here is a trapezium.

$2x - 3$

Diagram **NOT** accurately drawn

5

4

5

$2x + 3$

All the measurements are in cm.

The area of the trapezium is 18 cm².

Calculate the numerical value of the perimeter of the trapezium.

....cm

(Total for Question 14 is 6 marks)

15 Here is some information about a cricket and tennis club.

80 people belong to the club.
35 play cricket.
50 play tennis.
15 play both cricket and tennis.

(a) Draw a Venn diagram to show this information.

(4)

One of the people that belongs to the club is chosen at random.

(b) Work out the probability that this person does not play cricket or tennis.

....

(2)

(Total for Question 15 is 6 marks)

16 (a) Expand and simplify $(2x + 3)(3x - 4)$

....
(2)

(b) Factorise $9p^2 - 25q^2$

....
(2)
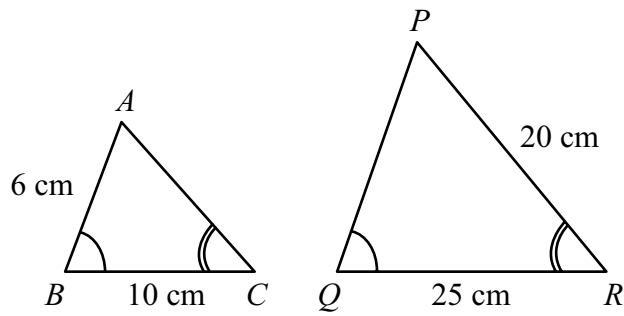
(Total for Question 16 is 4 marks)

*17 Prove that the sum of the squares of any two odd numbers is always even.

(Total for Question 17 is 4 marks)

18

Diagram **NOT** accurately drawn

ABC and *PQR* are two similar triangles.

(a) Find the length of *PQ*.

....cm

(2)

(b) Find the length of *AC*.

....cm

(2)

(Total for Question 18 is 4 marks)

19 Solve the equation $\dfrac{x+5}{3} = 2(x-3)$

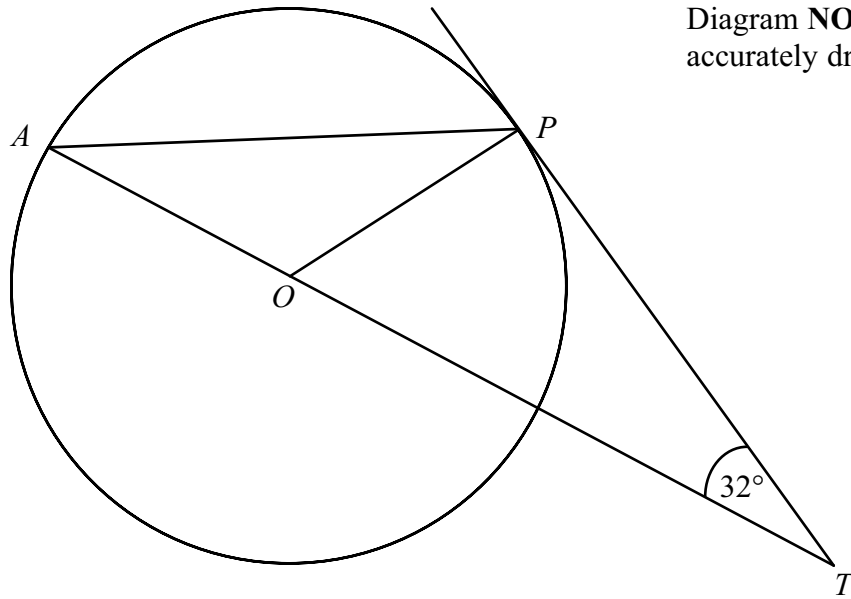...

(Total for Question 19 is 3 marks)
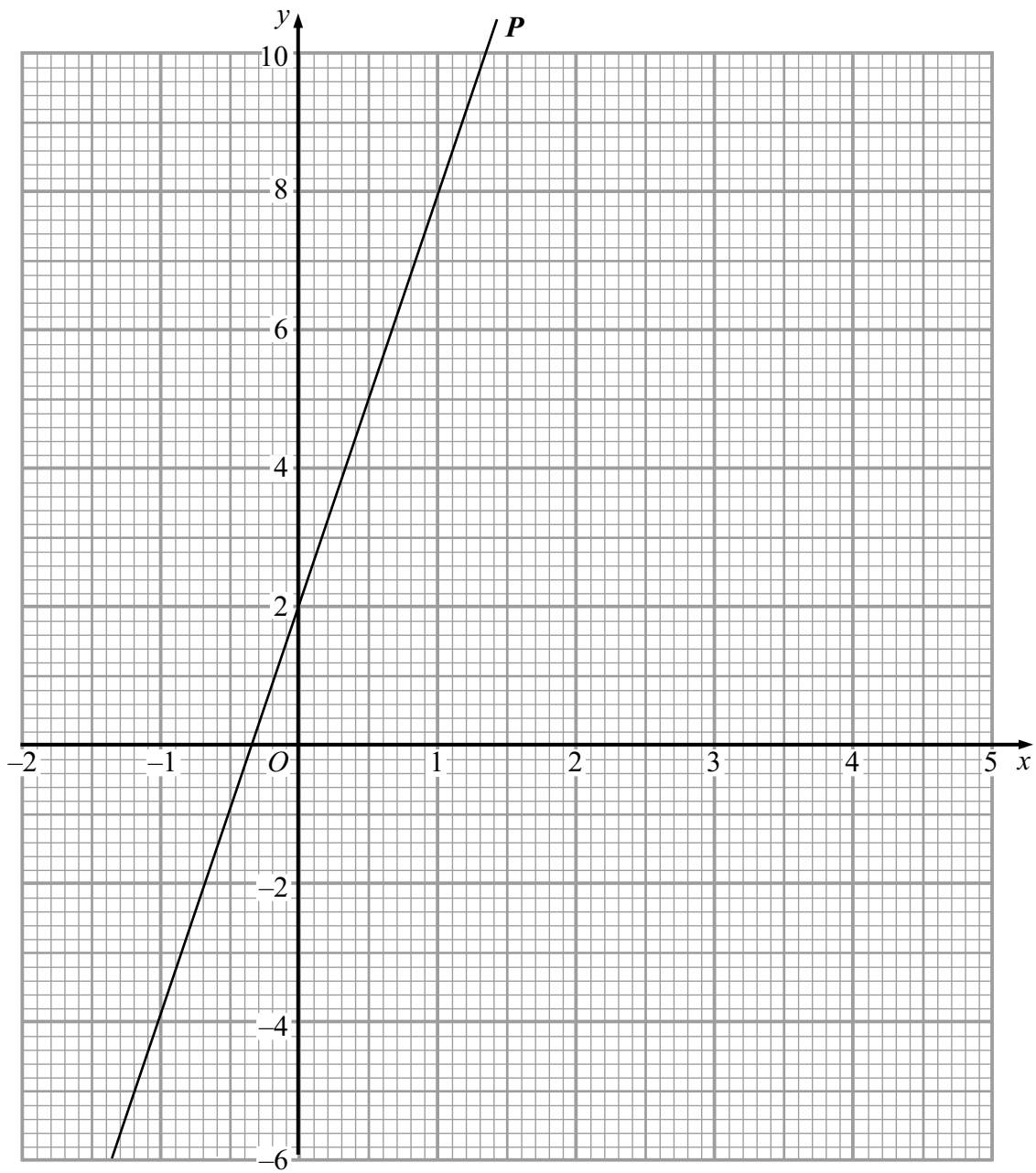
*20

Diagram **NOT** accurately drawn

A and *P* are points on the circumference of a circle, centre *O*.
TP is a tangent to the circle.
AOT is a straight line.
Angle *PTA* = 32°.

Work out the size of angle *OAP*.
You must give reasons for your answer.

21 The straight line *P* is drawn on the coordinate grid.

Find an equation for the straight line *P*.

....

(Total for Question 21 is 3 marks)

Turn over ▶

22 Solve the equation $\dfrac{x-1}{1} - \dfrac{6}{x-1} = 1$

....

(Total for Question 22 is 5 marks)

23

Diagram **NOT** accurately drawn
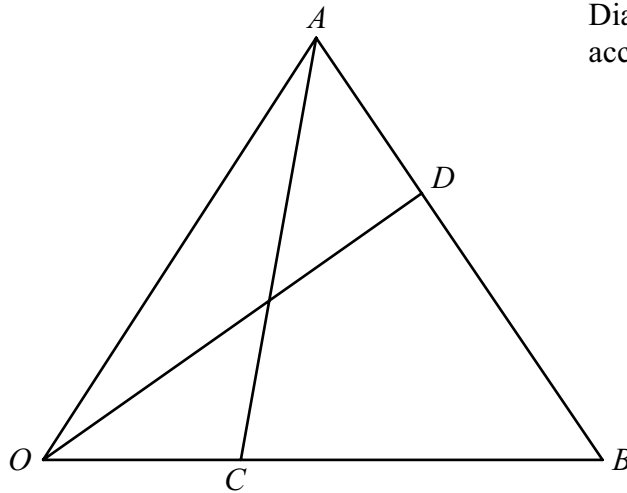
OAB is a triangle.

The point *D* divides the line *AB* in the ratio 1 : 2
The point *C* divides the line *OB* in the ratio 1 : 2

$\overrightarrow{OA} = 6\mathbf{a}$
$\overrightarrow{OB} = 6\mathbf{b}$

(a) Write down $\overrightarrow{AB}$ in terms of **a** and **b**.

....

(1)

*(b) Show that

CD is parallel to *OA* **and** the length of *CD* is $\dfrac{2}{3}$ the length of *OA*.

(5)

(Total for Question 23 is 6 marks)

P 3 8 9 5 6 A 0 1 9 2 0

24 There are 10 chocolates in a box.

There are 3 types of chocolates.

5 are plain chocolate.
3 are milk chocolate.
2 are white chocolate.

Gareth takes at random two chocolates from the box.

Work out the probability that both chocolates are of the same type.

....

(Total for Question 24 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS