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 12 November 2012 – Morning **Time: 1 hour 45 minutes**	Paper Reference **5MM1H/01**

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of 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.

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.

Turn over ▶

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6/6/7/

P 4 0 6 7 7 A 0 1 2 4

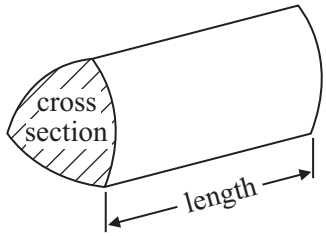
PEARSON

GCSE Mathematics 2MM01

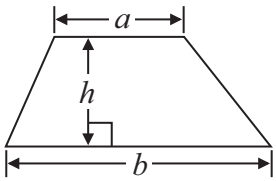
Formulae: Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of prism = area of cross section × length

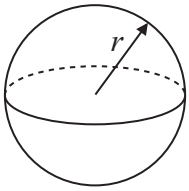


Area of trapezium = $\frac{1}{2}(a + b)h$



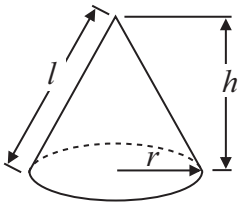
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$

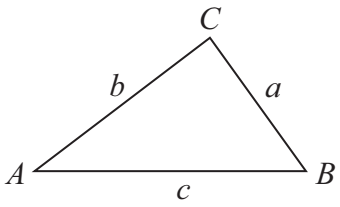


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



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 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1 Using the information that $246 \times 89 = 21\,894$ write down the value of

(i) 24.6×8.9

.....

(ii) 2.46×0.89

.....

(iii) $21\,894 \div 8.9$

.....

(Total for Question 1 is 3 marks)

2 There are red beads, green beads, blue beads and yellow beads in a bag.
Oscar is going to take at random a bead from the bag.

The table shows the probabilities that Oscar will take a red bead or a green bead.

Colour	**Red**	**Green**	**Blue**	**Yellow**
Probability	0.5	0.2		

It is equally likely that Oscar will take a blue bead or will take a yellow bead.

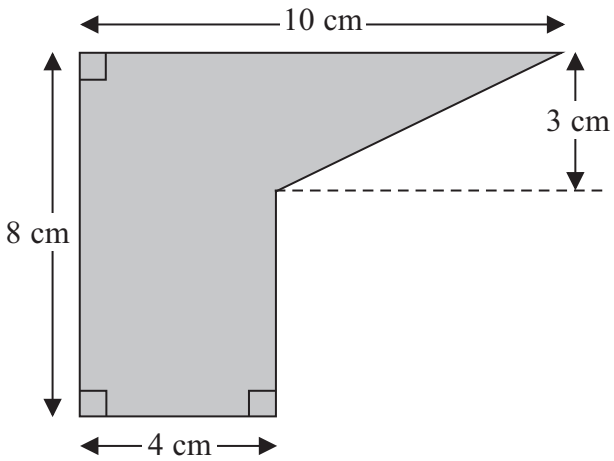
Work out the probability that Oscar will take a blue bead.

.....

(Total for Question 2 is 3 marks)

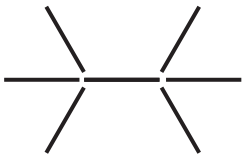
*3 Work out the area of the shaded shape.

Diagram **NOT** accurately drawn



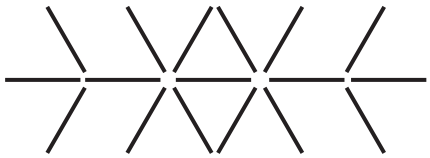
(Total for Question 3 is 4 marks)

4 Here is a sequence of patterns made from sticks.

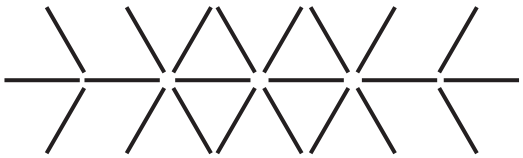


Pattern number 1

Pattern number 2



Pattern number 3



Pattern number 4

(a) Complete the table to show the number of sticks in each pattern.

Pattern number	1	2	3	4	5
Number of sticks	7	12	17	22	.....

(1)

(b) Find the number of sticks in Pattern number 8

.....

(1)

(c) Find an expression in terms of n for the number of sticks in Pattern number n.

.....

(2)

Ali has 60 sticks.
She wants to use as many sticks as possible to make a Pattern number.

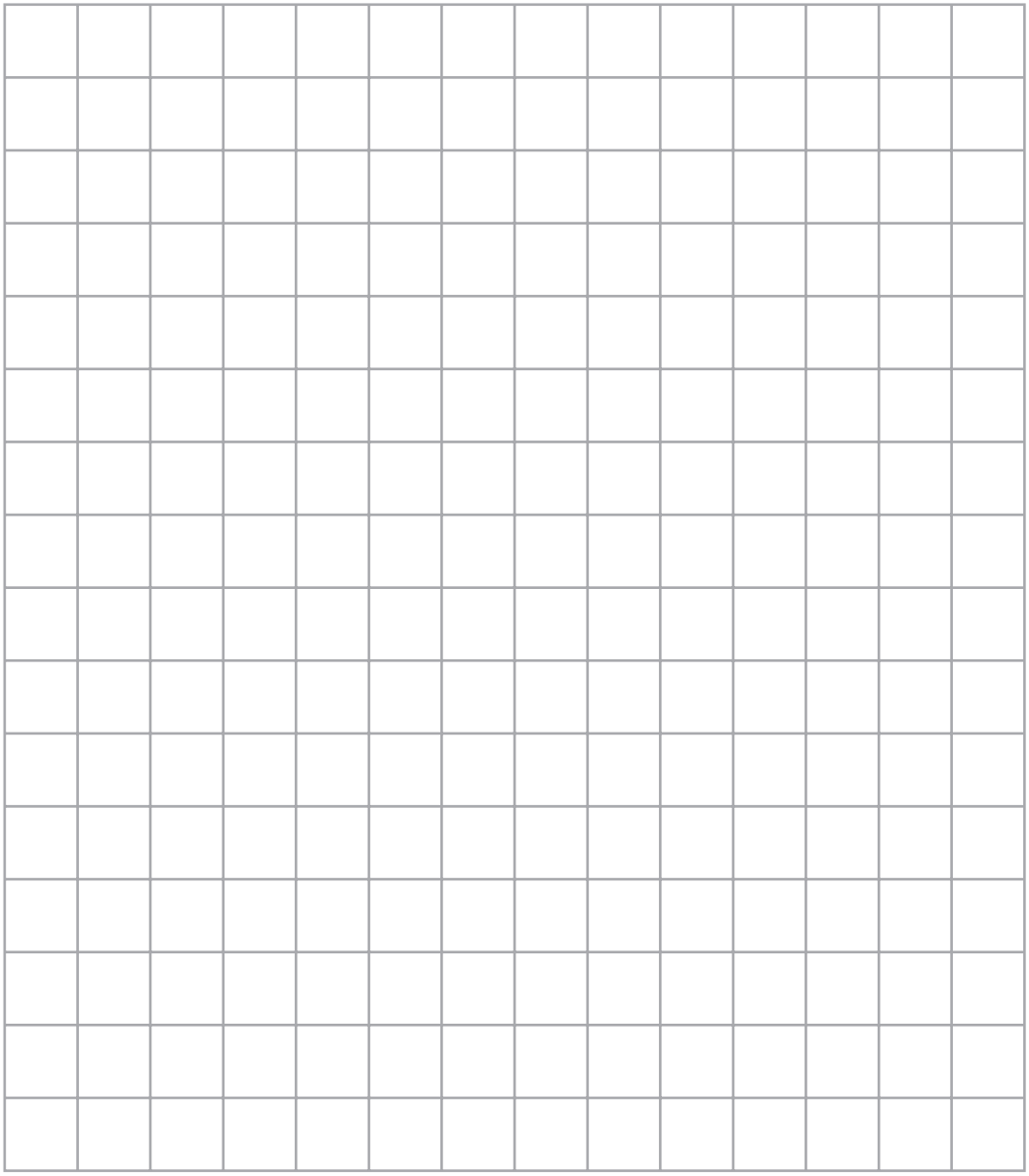
(d) What is the largest Pattern number she can make?

.....

(2)

(Total for Question 4 is 6 marks)

5 On the grid, draw the graph of $y = 2x + 3$ for values of x from -2 to 2



(Total for Question 5 is 4 marks)

6 Work out an estimate for the value of $\dfrac{316 \times 18.6}{0.48}$

.....

(Total for Question 6 is 3 marks)

7 (a) Simplify $3w \times 4w$

.....

(1)

(b) Simplify $4h - 2r + 3h + 7r + 5$

.....

(2)

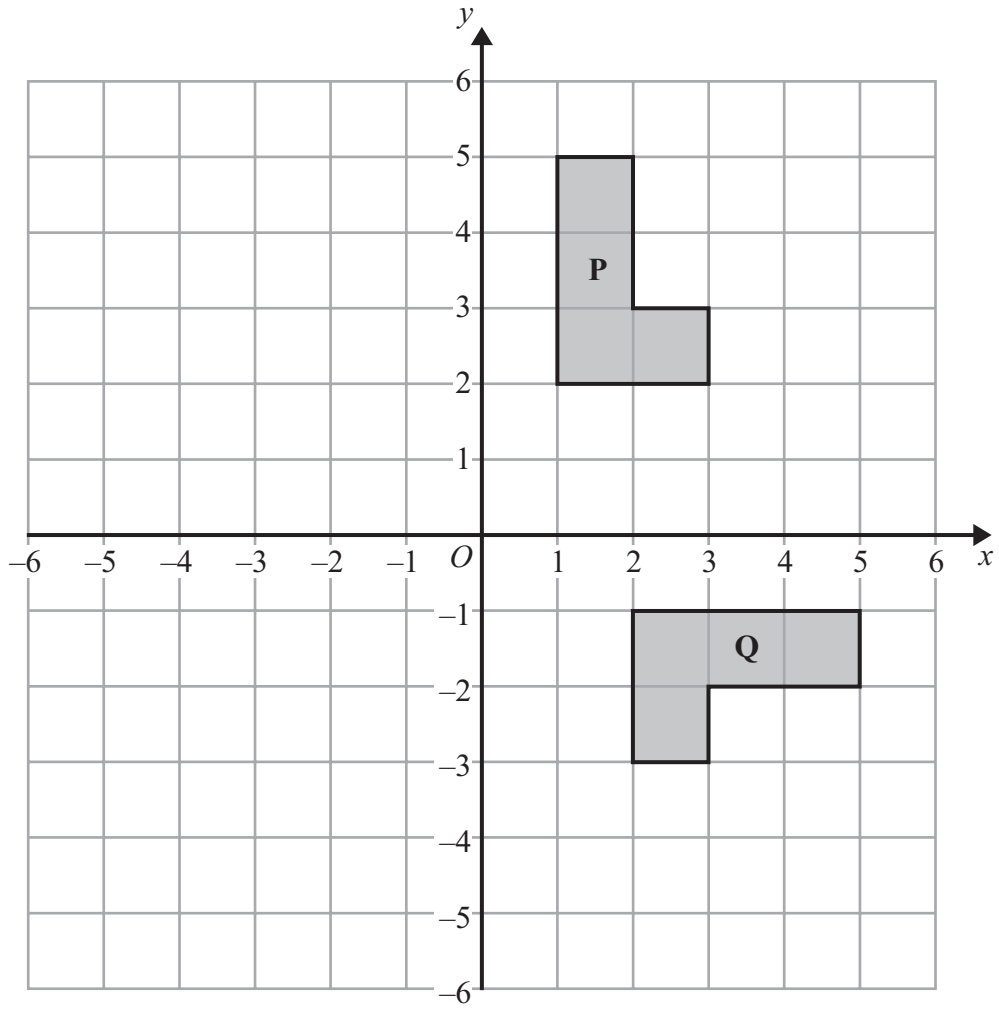
(c) Expand and simplify $(x + 7)(x - 3)$

.....

(2)

(Total for Question 7 is 5 marks)

8

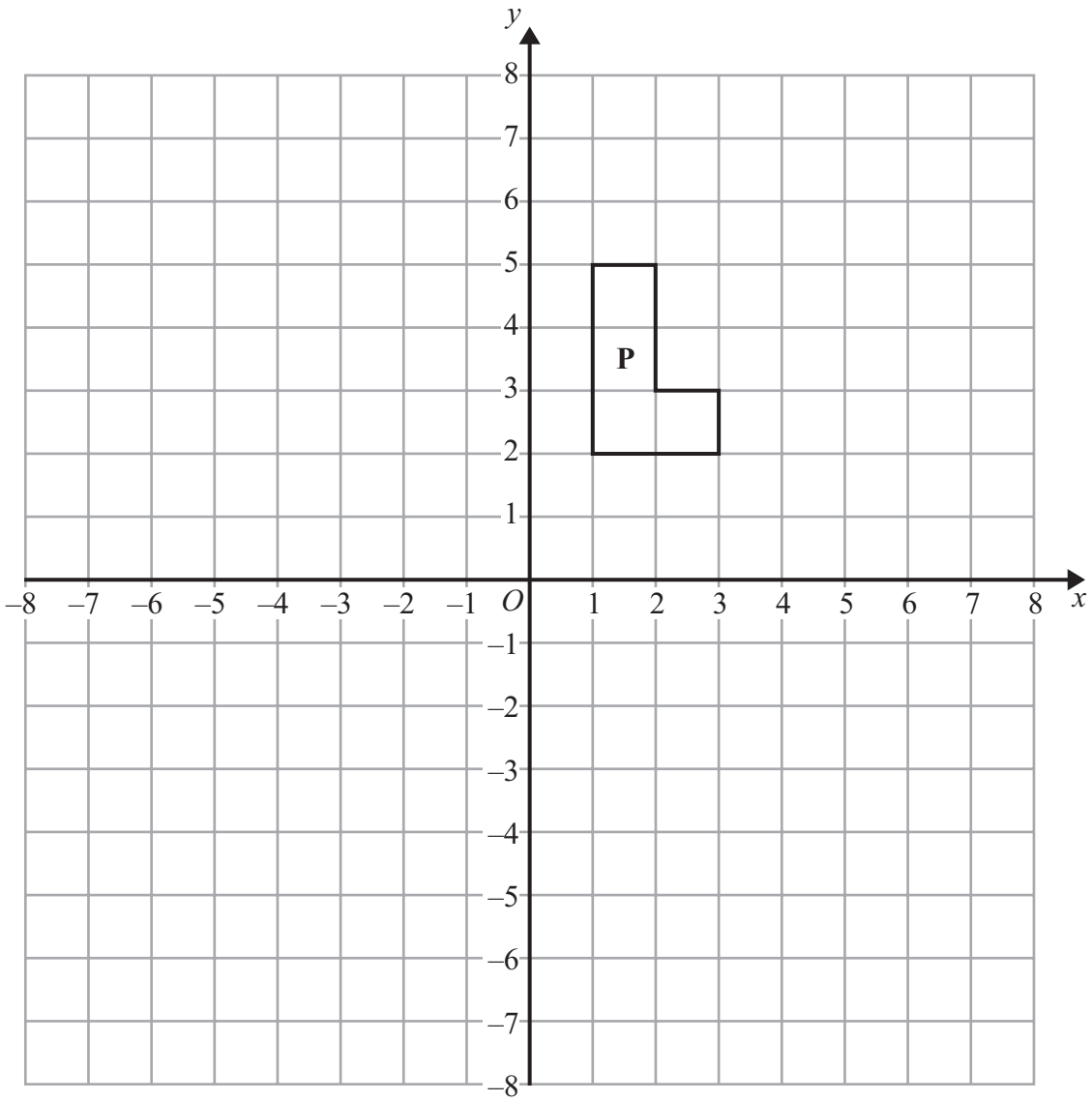


(a) Describe fully the **single** transformation that maps shape **P** onto shape **Q**.

.....

.....

(3)



(b) Reflect shape **P** in the line with equation $x = -2$

(2)

(Total for Question 8 is 5 marks)

9 Ramesh throws a biased coin.
The probability that the coin will land on a Head is 0.37

(a) Write down the probability that the coin will land on a Tail.

.....

(1)

Ramesh is going to throw the coin 500 times.

(b) Work out an estimate for the number of times that the coin will land on a Head.

.....

(2)

(Total for Question 9 is 3 marks)

10 (a) Work out $\frac{5}{8} \div \frac{3}{4}$

.....

(2)

(b) Work out $4\frac{1}{2} \times 1\frac{3}{5}$

.....

(3)

(Total for Question 10 is 5 marks)

11 x and y are two numbers each greater than 3

The Highest Common Factor (HCF) of x and y is 3
The Lowest Common Multiple (LCM) of x and y is 36

Find x and y.

.....

(Total for Question 11 is 2 marks)

12 Here are the equations of 5 straight lines **A**, **B**, **C**, **D** and **E**.

A $y = 3x + 4$

B $y = 2x - 3$

C $y = 2x + 3$

D $y = 5x - 4$

E $3y = x + 3$

One of the lines goes through the point (0, 3)

(a) Write down the letter of this line.

.....

(1)

Two of the lines are parallel.

(b) Write down the letters of these two lines.

....

(1)

(Total for Question 12 is 2 marks)

13 There are some people at a bus stop.

10 of the people are wearing a hat.
16 of the people are wearing sunglasses.
7 of the people are wearing a hat **and** sunglasses.
4 of the people are **not** wearing a hat and are **not** wearing sunglasses.

(a) Draw a Venn diagram for this information.

(4)

(b) Work out how many people are at the bus stop.

.....

(2)

A person is chosen at random from the people wearing a hat.

(c) Work out the probability that this person is wearing sunglasses.

.....

(2)

(Total for Question 13 is 8 marks)

14

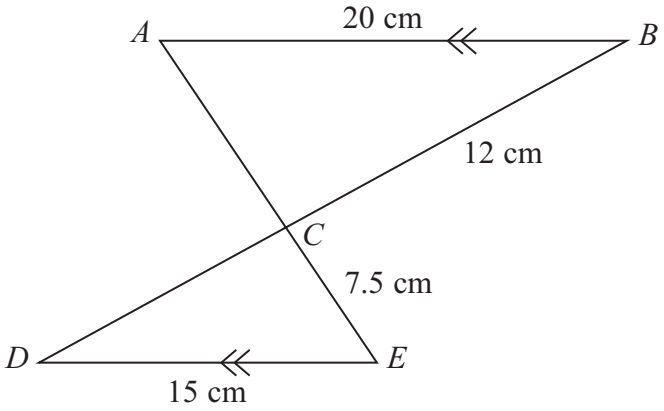


Diagram **NOT** accurately drawn

AB is parallel to *DE*.
ACE and *BCD* are straight lines.

AB = 20 cm
BC = 12 cm
CE = 7.5 cm
DE = 15 cm

(a) Work out the length of *AC*.

..... cm

(2)

(b) Work out the length of *DB*.

..... cm

(2)

(Total for Question 14 is 4 marks)

15 (a) Solve $11 - 4y = 6y - 3$

$y =$ .....

(2)

(b) Solve $x^2 - 3x - 40 = 0$

$x =$ ....., $x =$ .....

(3)

(Total for Question 15 is 5 marks)

16 (a) Write 8.2×10^5 as an ordinary number.

.....

(1)

(b) Write 0.00076 in standard form.

.....

(1)

(c) Work out the value of $(7 \times 10^3) \times (8 \times 10^9)$
Give your answer in standard form.

.....

(2)

(Total for Question 16 is 4 marks)

17 A student rolls a fair dice four times.

Work out the probability that the dice lands on the same number each time.

.....

(Total for Question 17 is 3 marks)

18 Find the value of n so that $\dfrac{2^6 \times 2^3}{2^n} = 2^5$

$n =$ .....

(Total for Question 18 is 2 marks)

19 Factorise fully $3xy^2 - 6x^3y$

.....

(Total for Question 19 is 2 marks)

20 Find the exact value of

(i) $9^{\frac{1}{2}}$

.....

(ii) 2^{-3}

.....

(iii) $25^{\frac{3}{2}}$

.....

(Total for Question 20 is 4 marks)

21 There are 20 counters in a bag.

8 of the counters are yellow.
12 of the counters are green.

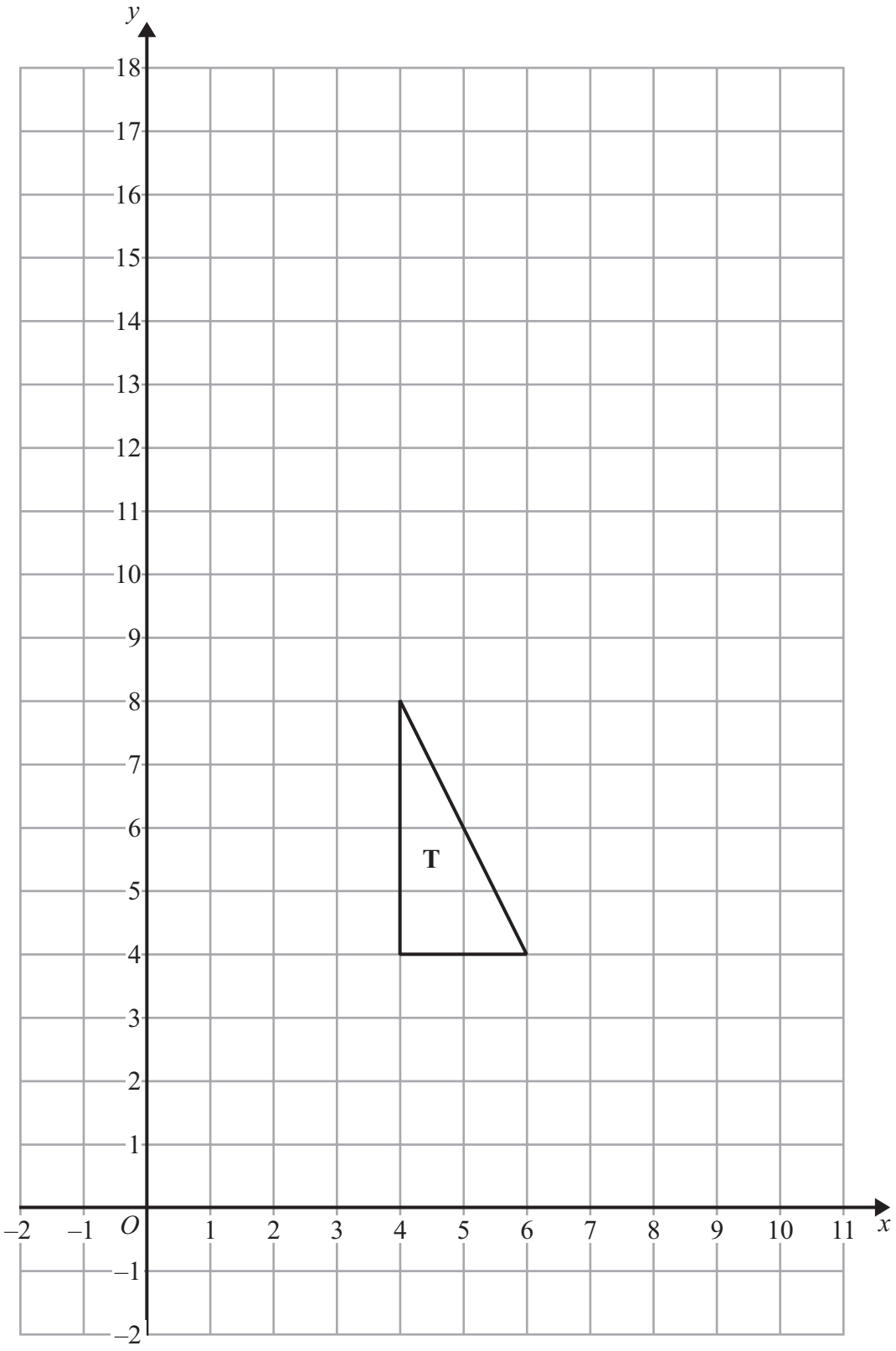
Asif takes at random two of the counters.

Work out the probability that the two counters are different colours.

.....

(Total for Question 21 is 4 marks)

22



Enlarge triangle **T** by a scale factor $\frac{1}{2}$, centre (2, 0).

(Total for Question 22 is 3 marks)

23 Two events, A and B, are mutually exclusive.

$P(A) = 0.3$
$P(B) = 0.5$

(a) Work out $P(A')$

.....

(1)

(b) Work out $P(A \cup B)$

.....

(1)

$P(C) = 0.4$
$P(D) = 0.2$

$P(C \cap D) = 0.06$

(c) Are C and D independent events?
Explain your answer.

.....

.....

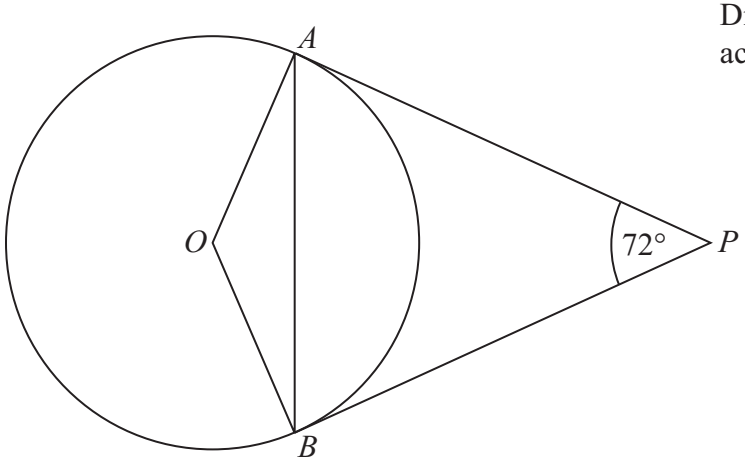
.....

(2)

(Total for Question 23 is 4 marks)

*24

Diagram **NOT** accurately drawn



A and *B* are points on the circumference of a circle, centre *O*.

PA and *PB* are tangents to the circle.
Angle *APB* = 72°

Calculate the size of angle *OBA*.
Give a reason for each stage in your working.

(Total for Question 24 is 5 marks)

25 Simplify fully $\dfrac{2x^2 - 7x + 3}{x^2 - 9}$

.....

(Total for Question 25 is 3 marks)

***26** Prove that the sum of the squares of two consecutive odd numbers is never a multiple of 8

(Total for Question 26 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

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