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 17 June 2013 – 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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6/6/8/

P 4 0 6 5 1 A 0 1 2 4

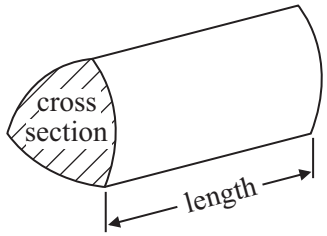
PEARSON

GCSE Mathematics 2MM01

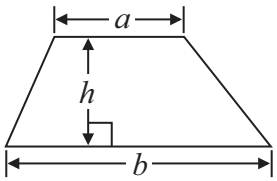
Formulae: Higher Tier

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

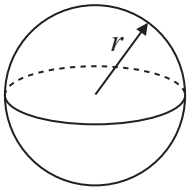


Area of trapezium = $\frac{1}{2}(a + b)h$



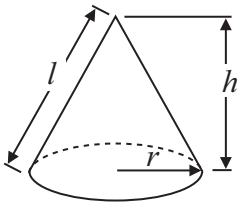
Volume of sphere = $\frac{4}{3}\pi r^3$

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

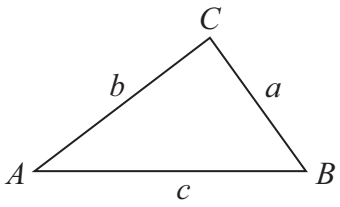


Volume of cone = $\frac{1}{3}\pi r^2 h$

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 $e = 5$

$f = -2$

(a) Work out the value of $2e + 3f$

.....

(2)

$h = 5$

(b) Work out the value of $2h^2$

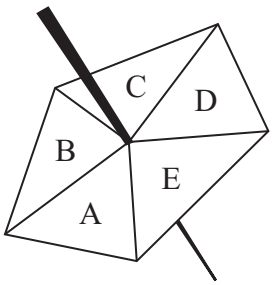
.....

(2)

(Total for Question 1 is 4 marks)

2 Here is a 5-sided spinner.
The sides of the spinner are labelled A, B, C, D and E.

Izrah spins the spinner 40 times.



The table shows the number of times the spinner lands on A, on B, on C, on D and on E.

Outcome (letter)	A	B	C	D	E
Frequency	18	13	3	4	2

(a) Is the spinner biased? .....

Use the numbers in the table to explain your answer.

.....

.....

.....

(1)

Thomas spins the spinner once.

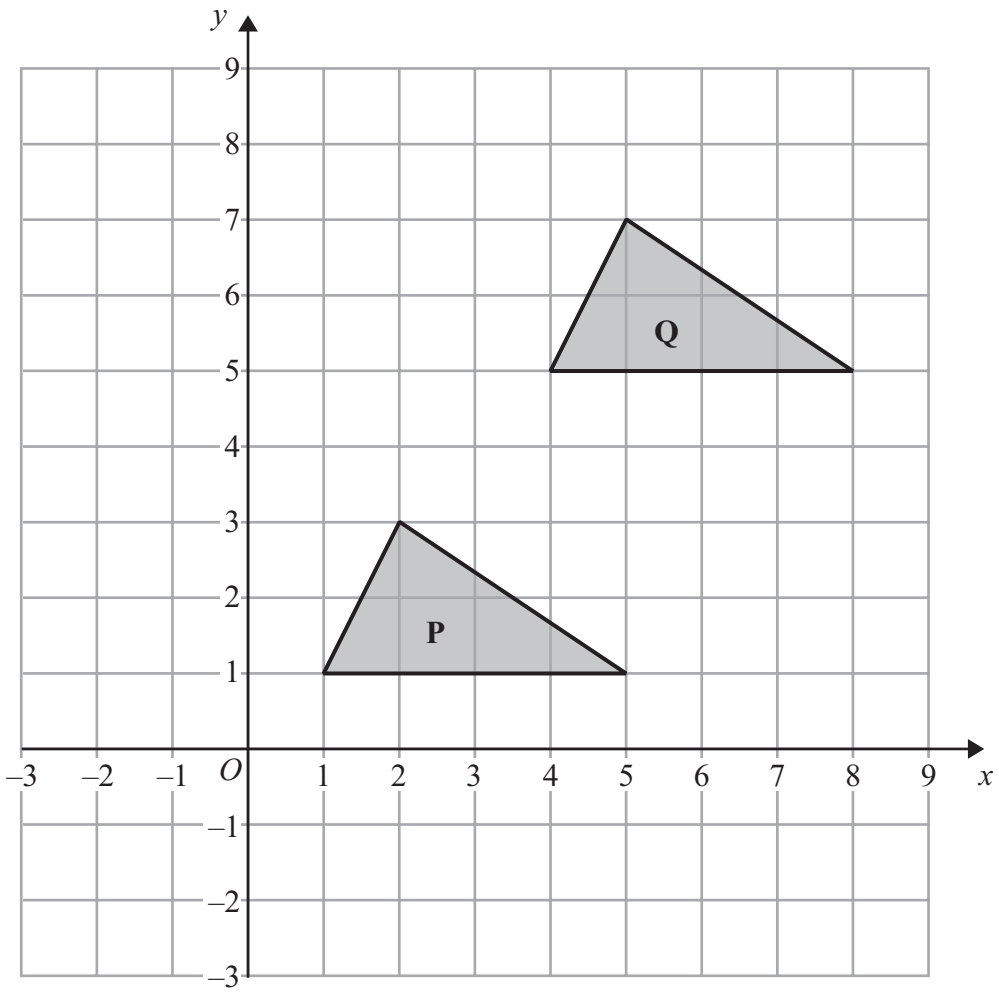
(b) Using the information in the table find an estimate for the probability that the spinner will land on E.

.....

(2)

(Total for Question 2 is 3 marks)

3



Describe fully the single transformation that maps triangle **P** onto triangle **Q**.

.....

.....

.....

(Total for Question 3 is 2 marks)

4 (a) Simplify $3x \times 4y$

.....

(1)

(b) Expand $2(c - 2d)$

.....

(1)

(c) Simplify $a^5 \times a^4 \div a^3$

.....

(2)

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

.....

(2)

(e) Factorise fully $6ef + 9e^2$

.....

(2)

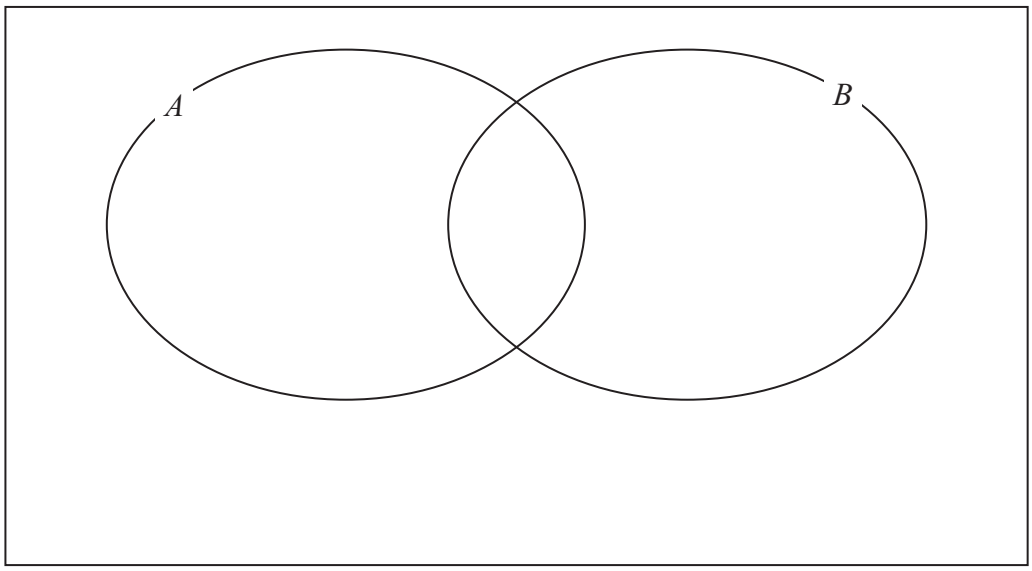
(Total for Question 4 is 8 marks)

5 Here is a list of numbers.

30 31 32 33 34 35 36 37 38 39 40

set A = {30, 33, 36, 39}
set B = {31, 33, 35, 37, 39}

(a) Write each number from the list in the correct place in the Venn diagram.



(4)

A number is chosen at random from the numbers in the list.

(b) Find the probability that the number is in both set A and set B.

$P(A \cap B)$ = ...

(1)

(c) Find the probability that the number is **not** in set A.

$P(A')$ = ...

(1)

(Total for Question 5 is 6 marks)

6 Sam rolls a fair dice 150 times.

Work out an estimate for the number of times the dice will land on 4

.....

(Total for Question 6 is 2 marks)

7 Given that

$$124 \times 68 = 8432$$

work out the value of

(a) 1.24×6.8

.....

(1)

(b) 124×34

.....

(1)

(Total for Question 7 is 2 marks)

8 Here is a symmetrical shape.

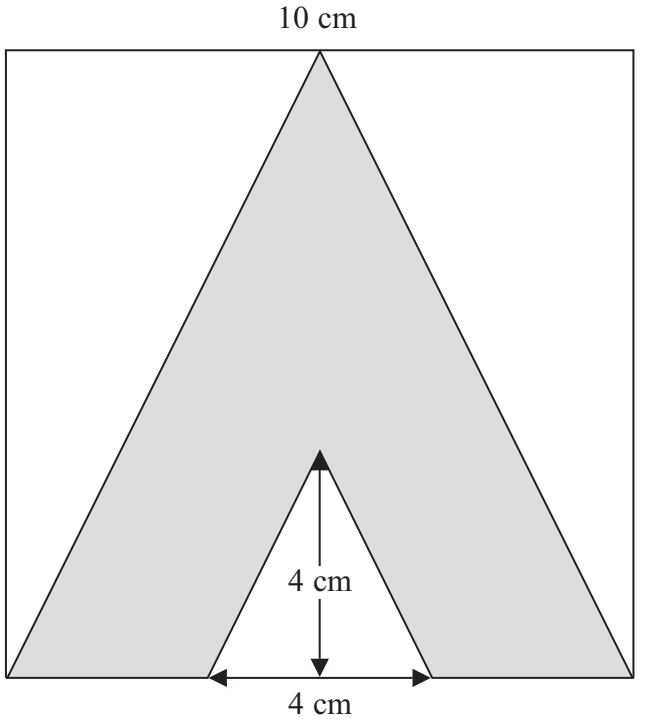


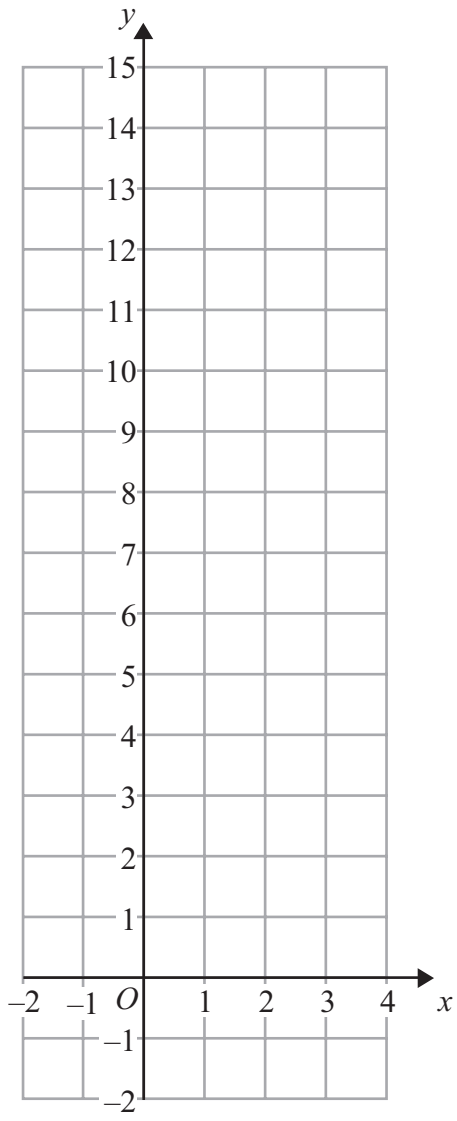
Diagram **NOT** accurately drawn

Work out the area of the shape that is shaded.

.....

(Total for Question 8 is 4 marks)

9 (a) On the grid, draw the graph of $y = 3x + 5$ for values of x from –2 to 3



(3)

*(b) Explain why the point (6, 24) does **not** lie on the line $y = 3x + 5$

(2)

(Total for Question 9 is 5 marks)

10 Work out 42.7×5.6

.....

(Total for Question 10 is 3 marks)

***11** The diagram shows a triangle.

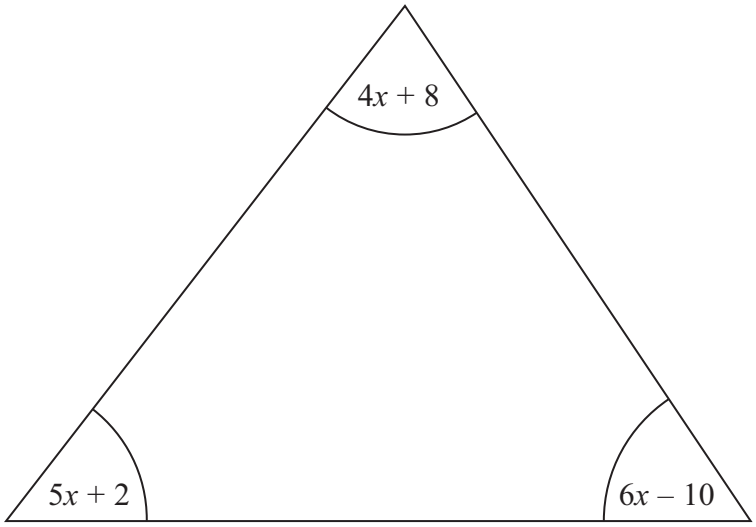


Diagram **NOT** accurately drawn

All the angles are measured in degrees.

Show that the triangle is isosceles.

(Total for Question 11 is 5 marks)

12 (a) Express 80 as a product of its prime factors.

.....

(3)

(b) Find the Highest Common Factor (HCF) of 80 and 32

.....

(2)

(Total for Question 12 is 5 marks)

13 Here are the first five terms of an arithmetic sequence.

11 19 27 35 43

(a) Find an expression, in terms of n, for the nth term of this sequence.

.....

(2)

The nth term of another sequence is given by $46 - 3n$

(b) Find the first three terms of this sequence.

.....

(2)

(Total for Question 13 is 4 marks)

---

14 Find the value of

(a) 6^0

.....

(1)

(b) 4^{-2}

.....

(1)

(c) $64^{\frac{1}{3}}$

.....

(1)

(Total for Question 14 is 3 marks)

15 The diagram shows two identical squares placed side by side to form a rectangle.

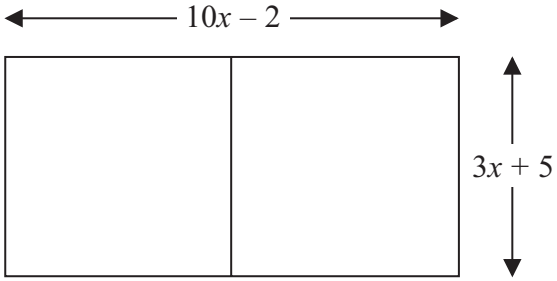


Diagram **NOT** accurately drawn

All measurements are in centimetres.

Calculate the numerical value of the length of the rectangle.

..... cm

(Total for Question 15 is 4 marks)

16

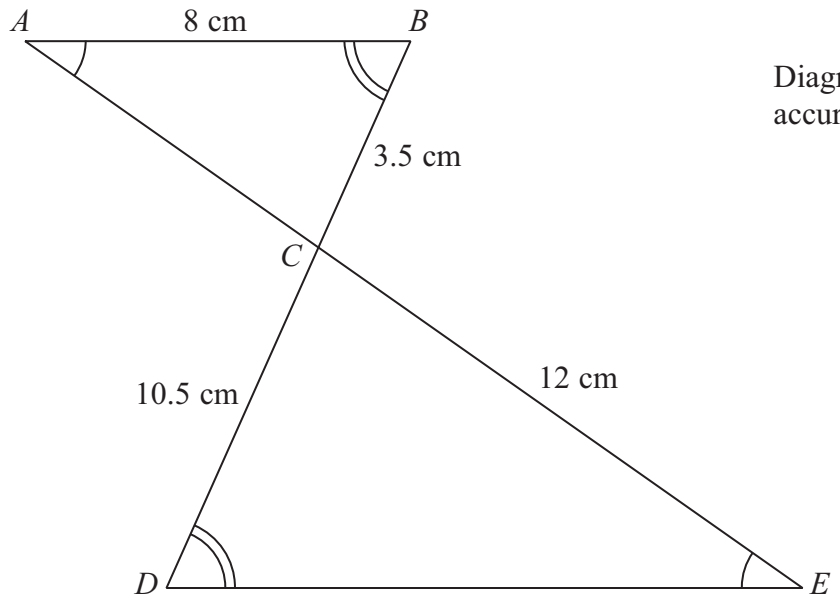


Diagram **NOT** accurately drawn

Triangles *ABC* and *EDC* are similar.

ACE and *BCD* are straight lines.

Angle *BAC* = Angle *DEC*
Angle *CBA* = Angle *CDE*

AB = 8 cm, *BC* = 3.5 cm, *CD* = 10.5 cm and *CE* = 12 cm

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

..... cm

(2)

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

..... cm

(2)

(Total for Question 16 is 4 marks)

17 Solve $x^2 - 2x - 24 = 0$

.....

(Total for Question 17 is 3 marks)

18 (a) Write the number 12 000 000 in standard form.

.....

(1)

(b) Write 2.57×10^{-3} as an ordinary number.

.....

(1)

(c) Work out $(1.56 \times 10^4) + (4.9 \times 10^3)$
Give your answer in standard form.

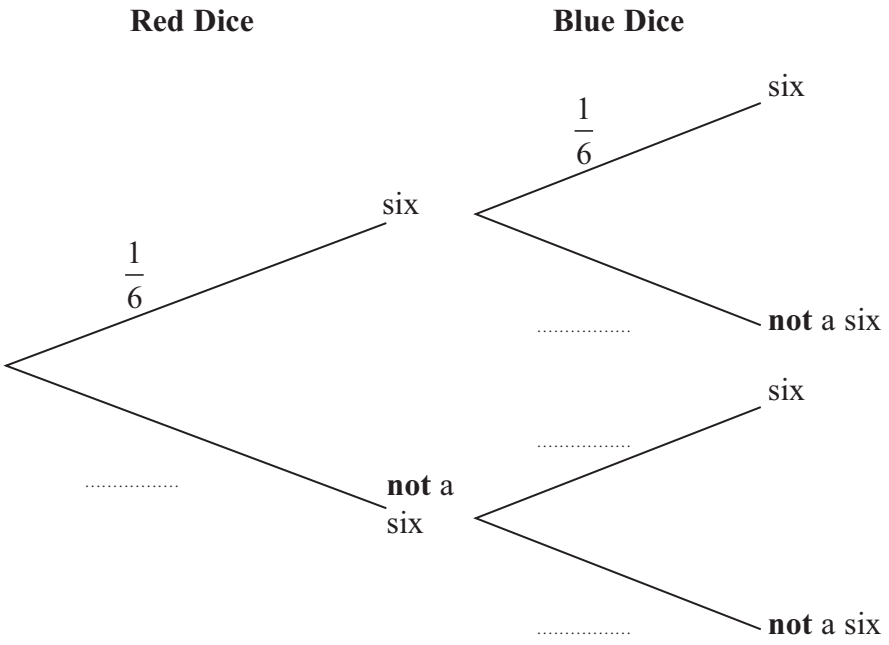
.....

(2)

(Total for Question 18 is 4 marks)

19 A fair red dice and a fair blue dice are going to be thrown.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that exactly one dice will land on a six.

.....

(3)

(Total for Question 19 is 5 marks)

***20**

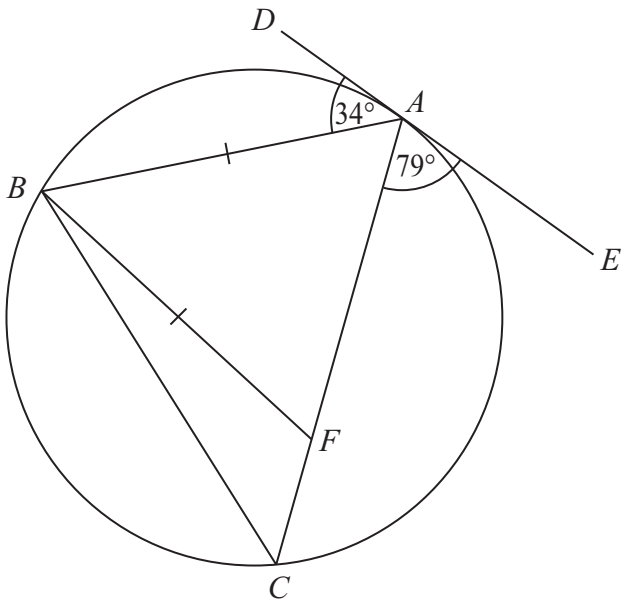


Diagram **NOT** accurately drawn

A, *B* and *C* are points on the circumference of a circle.
DAE is a tangent to the circle.
F is the point on *AC* such that triangle *ABF* is isosceles.

AB = *BF*
Angle *DAB* = 34°
Angle *EAC* = 79°

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

(Total for Question 20 is 5 marks)

21 A and B are two independent events.

$P(A) = 0.7$
$P(B) = 0.4$

(a) Find the value of $P(A')$

$P(A') =$ .....

(1)

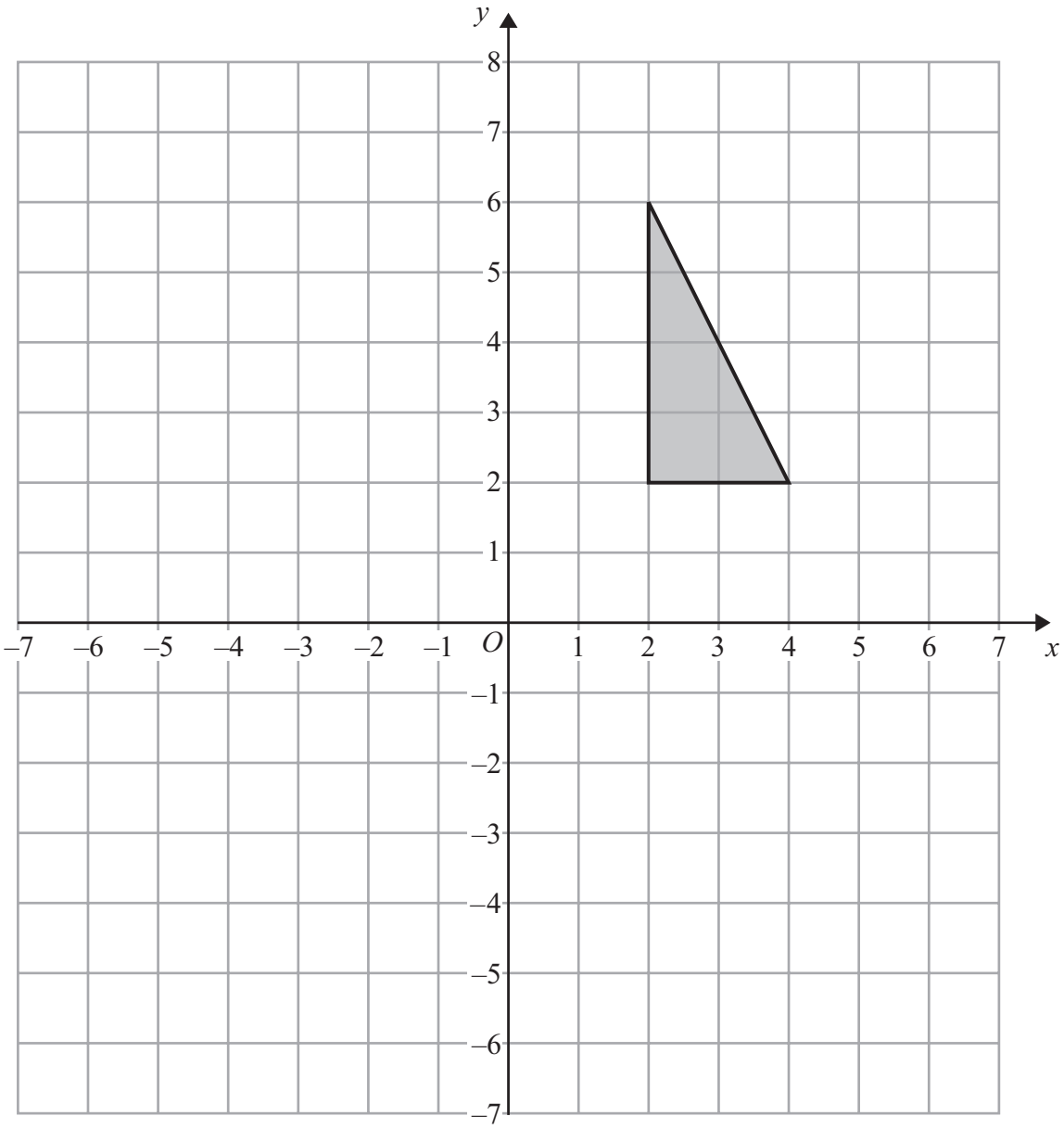
(b) Work out the value of $P(A \cap B)$

$P(A \cap B) =$ .....

(2)

(Total for Question 21 is 3 marks)

22



Enlarge the shaded shape by a scale factor of $-1\frac{1}{2}$, centre (0, 4).

(Total for Question 22 is 3 marks)

***23** n is an integer greater than 1

Use algebra to show that $(n^2 - 1) + (n - 1)^2$ is always equal to an even number.

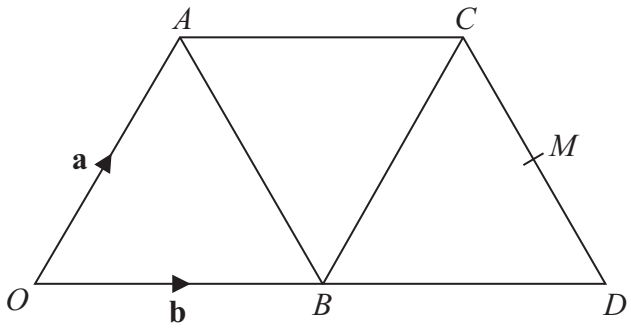
(Total for Question 23 is 4 marks)

24 $OACD$ is a trapezium made from three equilateral triangles.

$\overrightarrow{OA} = \mathbf{a}$

$\overrightarrow{OB} = \mathbf{b}$

M is the midpoint of CD.



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

.....

(1)

(b) Show that $\overrightarrow{OC}$ is parallel to $\overrightarrow{BM}$.

(4)

(Total for Question 24 is 5 marks)

Turn over for Question 25

25 There are 3 black counters, 5 grey counters and 2 white counters in a bag.

Susie takes at random two counters from the bag.

Calculate the probability that Susie takes at least one black counter.

.....

(Total for Question 25 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS