

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

4352/02

**MATHEMATICS (UNITISED SCHEME)
UNIT 2: Non-Calculator Mathematics
HIGHER TIER**

P.M. THURSDAY, 8 November 2012

$1\frac{1}{4}$ hours

**CALCULATORS ARE
NOT TO BE USED
FOR THIS PAPER**

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3.14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

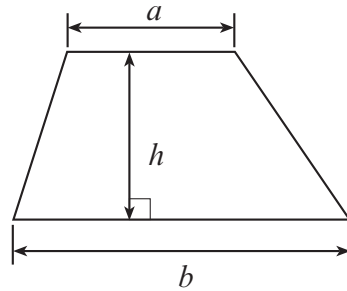
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 4(b).

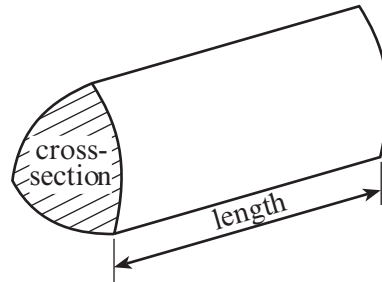
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	5	
2	6	
3	4	
4	8	
5	8	
6	2	
7	3	
8	6	
9	3	
10	5	
11	4	
12	7	
13	4	
TOTAL MARK		

Formula List

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

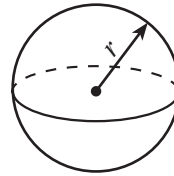


Volume of prism = area of cross-section \times length



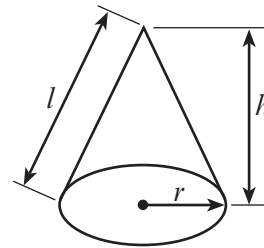
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

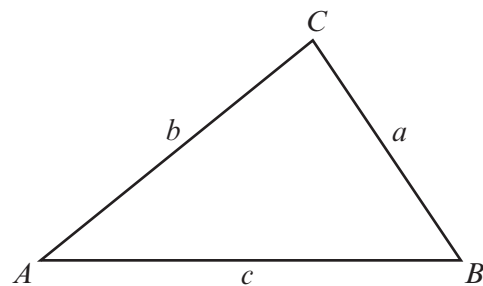


In any triangle ABC

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 = $\frac{1}{2}ab \sin C$



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$ are given by

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

1. Five children each threw the same dice 12 times.
They recorded how many sixes they each threw with this dice.
The results are shown below.

Name	Abbi	Sasha	Meinir	Samad	Jenny
Number of sixes	5	3	2	4	6

- (a) Use Abbi's result to estimate the probability of **not** throwing a six on any single throw of the dice.

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[2]

- (b) Do you think the dice thrown was fair or biased?
You must show your working and give a reason for your answer.

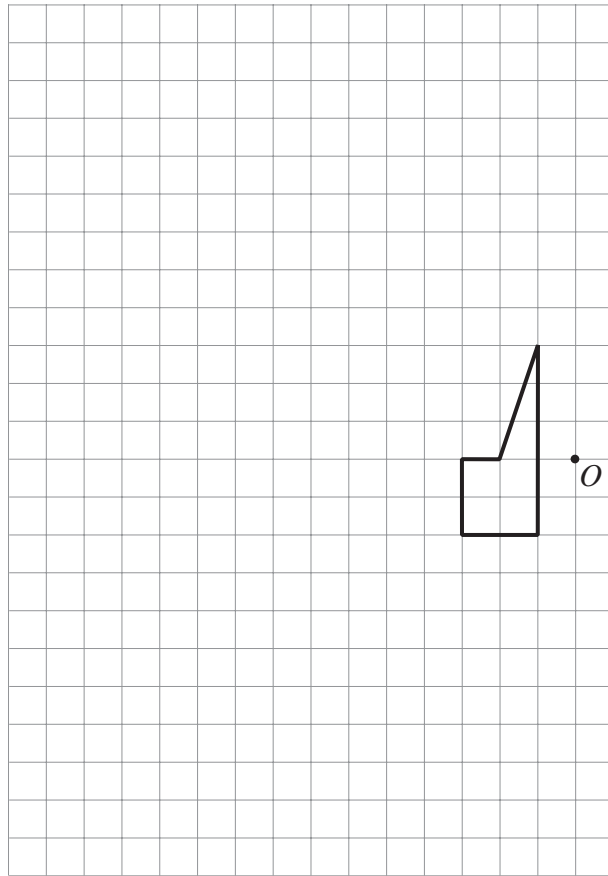
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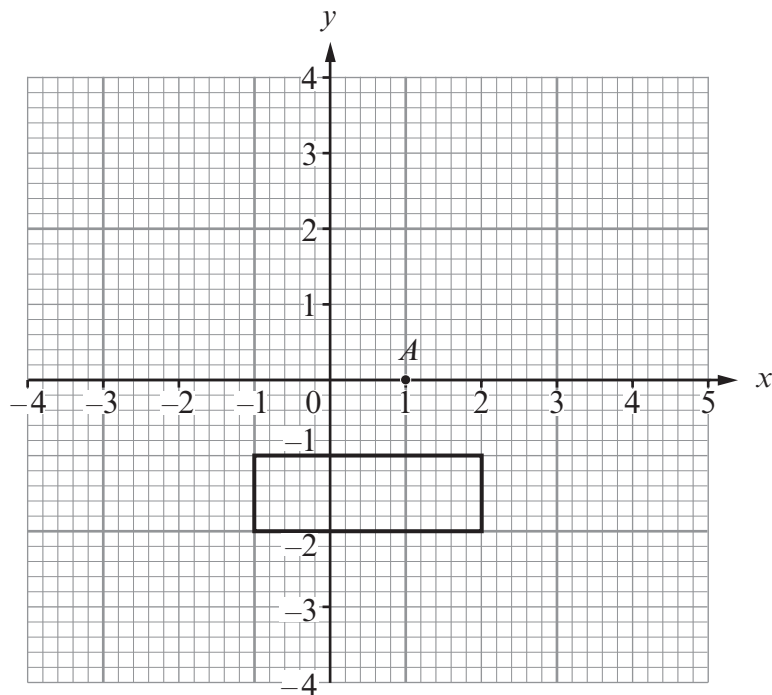
2. (a) On the grid below, draw the enlargement of the given shape using a scale factor of 3 and centre O .

[3]



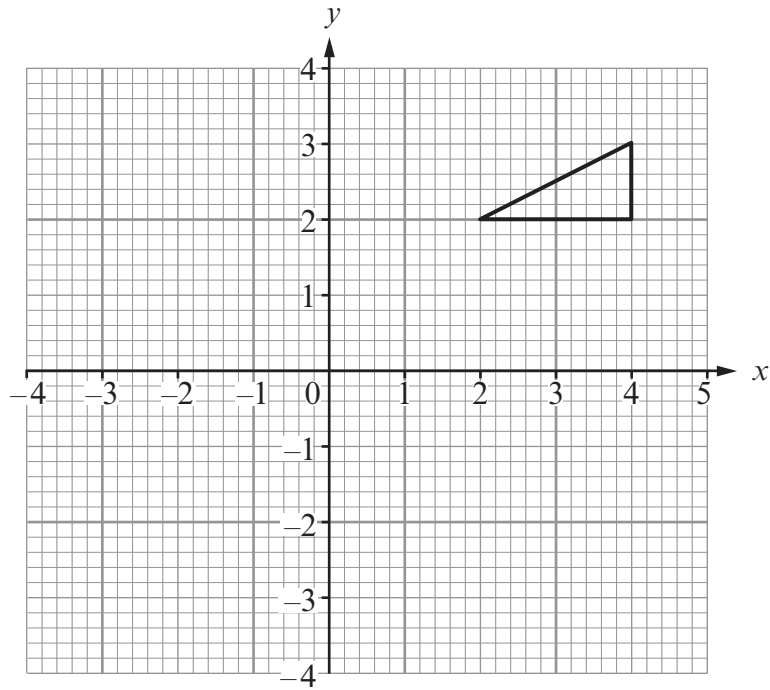
- (b) Rotate the rectangle through 180° about the point $A(1, 0)$.

[1]



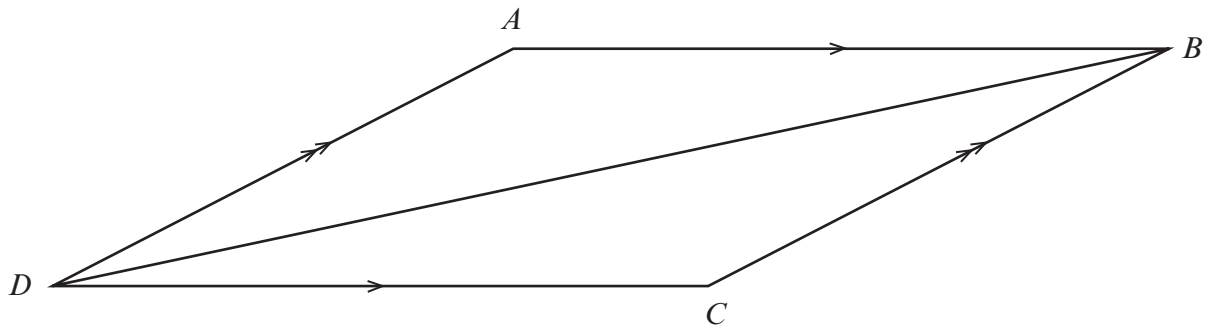
(c) Draw the reflection of the shape in the line $x = 1$.

[2]



Examiner
only

3.

*Diagram not drawn to scale*

The diagram shows a parallelogram $ABCD$ with $\widehat{ADB} = 17^\circ$ and $\widehat{ABC} = 40^\circ$.
Calculate the size of each of the following angles.

(a) \widehat{ADC}

..... [1]

(b) \widehat{DBC}

..... [1]

(c) \widehat{BCD}

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 [2]

4. Path edging strips come in two different lengths.

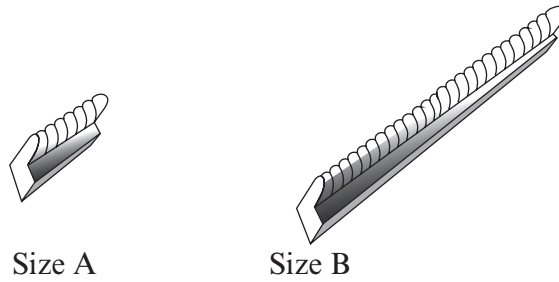


Diagram not drawn to scale

Size A is x cm long and size B is four times as long as size A.

- (a) Robbie uses 3 size A and 6 size B strips to edge one side of the length of his path.
Write down and simplify an expression, in terms of x , for the length of Robbie's path in centimetres.

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[2]

- (b) *You will be assessed on the quality of your written communication in this part of the question.*
 Sammy's path is twice as long as Robbie's path.
 Sammy decides to use the edging strips along one side of the length of his path.
 He wants to use as many size B strips as possible, with as few size A strips as possible.
 How can he do this?
 You must state the number of each size strip he should use.

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[6]

5. (a) Expand $y^2(y^3 - 2)$.

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..... [2]

- (b) Factorise $8x^3 + 16$.

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..... [2]

- (c) Solve $7x < 2x + 30$.

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..... [2]

- (d) Write down the n th term of the sequence 9, 13, 17, 21, 25 ...

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..... [2]

6. Express each of the following numbers in standard form.

- (a) 0.00083

..... [1]

- (b) 460000

..... [1]

7. Make b the subject of the following formula

$$bc = bd + e$$

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[3]

8.

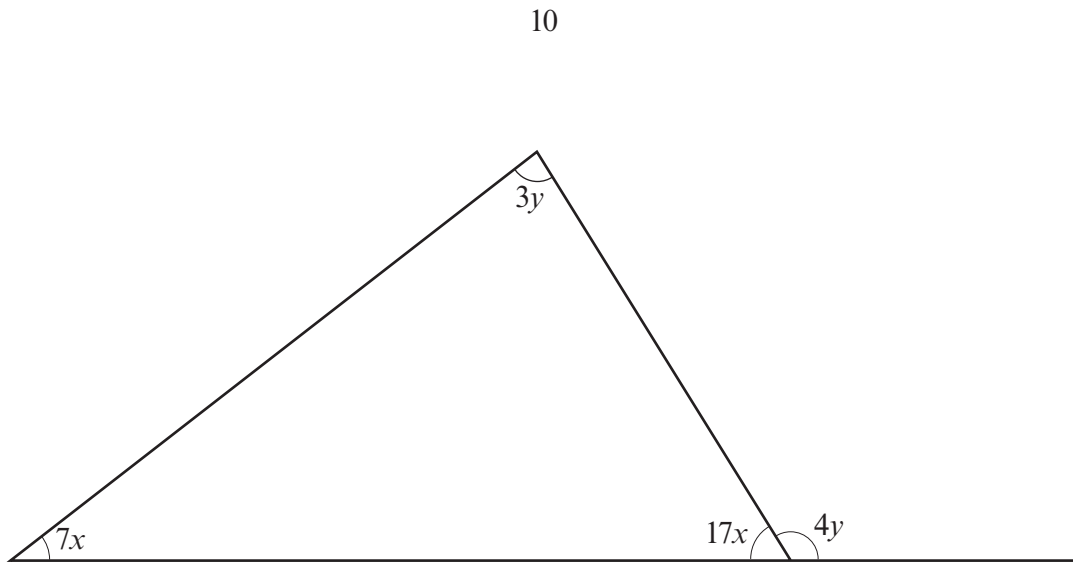


Diagram not drawn to scale

Calculate the values of x and y .

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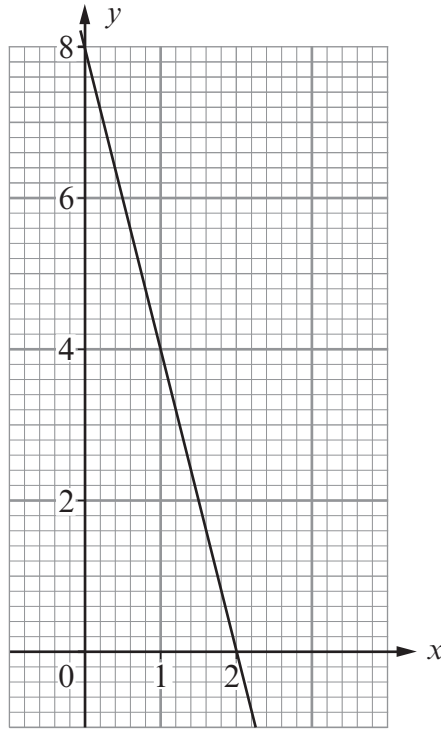
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$x = \dots\dots\dots^\circ$ $y = \dots\dots\dots^\circ$

[6]

9. Gareth was asked to use the following clues to find the equation of a mystery straight line.

Clue 1: The mystery straight line is parallel to the one shown in the diagram below.



Clue 2: The mystery straight line passes through the point with coordinates (0, 5).

Use these clues to find the equation of the mystery straight line.

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Equation of the mystery straight line is

[3]

10. The circle shown has a centre O .
The lines PR and TR are tangents to the circle.

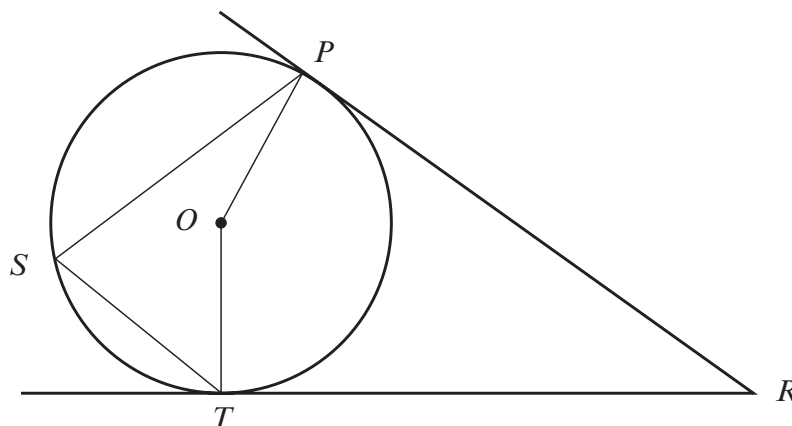


Diagram not drawn to scale

- (a) Write down the size of \widehat{OPR} and give a reason for your answer.

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 [1]

- (b) Which line in the diagram is equal in length to PR ? Give a reason for your answer.

$PR = \dots\dots\dots$

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 [1]

- (c) Given that $\widehat{PRT} = 42^\circ$, find the size of \widehat{PST} .

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$\widehat{PST} = \dots\dots\dots^\circ$

[3]

11. (a) Express $0.\dot{4}\dot{7}$ as a fraction.

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(b) Simplify $8000^{-\frac{2}{3}}$.

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12. (a) A bag contains 5 red balls, 4 blue balls and one yellow ball.
Two balls are selected at random, without replacement, from the bag.
Calculate the probability that the two balls selected are **not** the same colour.

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- (b) A bag contains a very large number of ball bearings.
65% of the ball bearings are made of steel. The other ball bearings are made of cast iron.
Two ball bearings are selected at random from the bag.
Calculate the probability that they are both made of cast iron.
Give your answer as a percentage.

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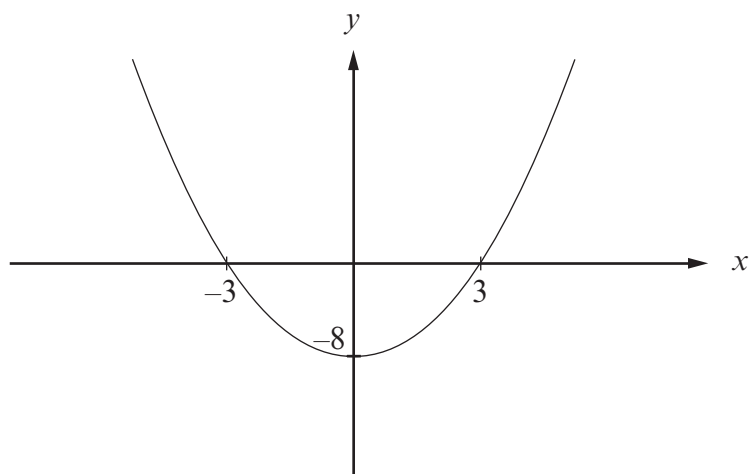
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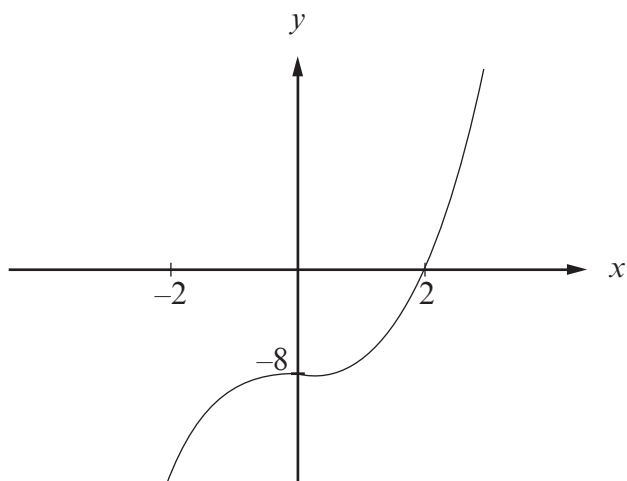
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13. (a) The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = f(x) - 5$.
Mark clearly the value of y at the point where this curve crosses the y -axis.



[2]

- (b) The diagram shows a sketch of $y = g(x)$.
On the same diagram, sketch the curve $y = -g(x)$.
Mark clearly the value of y at the point where this curve crosses the y -axis.



[2]