

Surname	Centre Number	Candidate Number
Other Names		0



**GCSE**

4352/02

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

P.M. TUESDAY, 15 January 2013

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

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

**INSTRUCTIONS TO CANDIDATES**

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

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.

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

Take  $\pi$  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 1.

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

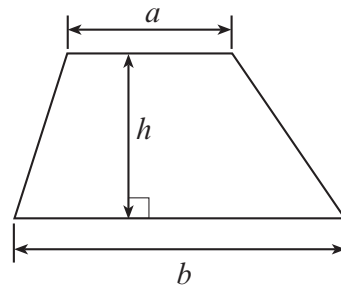
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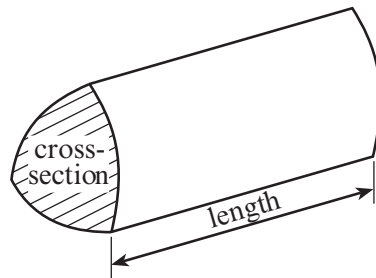
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### Formula List

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

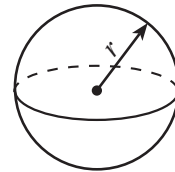


**Volume of prism** = area of cross-section  $\times$  length



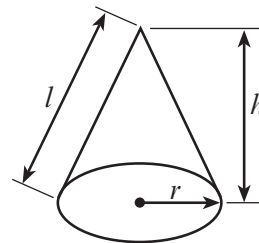
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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



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

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

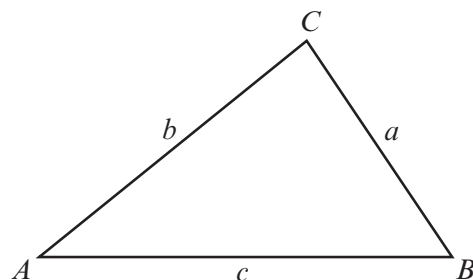


**In any triangle ABC**

**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

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







3. (a) Make  $q$  the subject of the following formula.

$$3q + h^2 = m$$

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[2]

- (b) Solve  $\frac{3x}{2} = 15$ .

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[2]



4. The table shows values of  $y = 3x^2 + 2x - 10$  for values of  $x$  from  $-4$  to  $3$ .

$x$	$-4$	$-3$	$-2$	$-1$	$0$	$1$	$2$	$3$
$y = 3x^2 + 2x - 10$	$30$		$-2$	$-9$	$-10$	$-5$	$6$	$23$

- (a) Complete the table above.

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[1]

- (b) On the graph paper below, draw the graph of  $y = 3x^2 + 2x - 10$  for values of  $x$  from  $-4$  to  $3$ .

[2]



- (c) Write down the  $x$ -coordinates of the points where the graph of  $y = 3x^2 + 2x - 10$  intersects the  $x$ -axis.

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[1]



5. (a) Find the  $n$ th term for the following sequence.

12, 9, 6, 3, 0, -3, ...

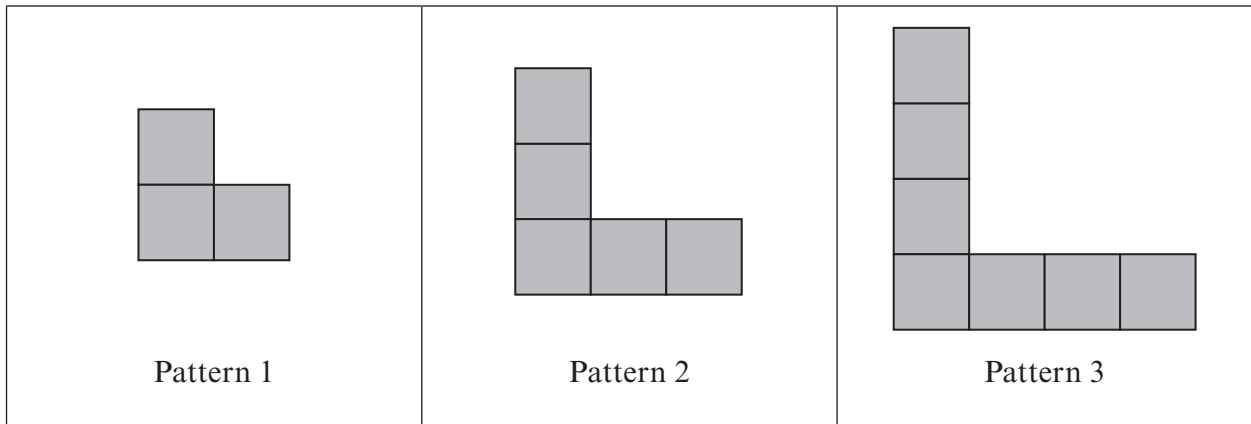
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[2]

- (b) Patterns are made using small squares.



Find an expression for the number of squares in Pattern  $n$ .

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[2]



6. (a) Rafi has been asked to paint a region on a coordinate grid.  
He is given the following criteria.  
The region must be such that

- $y \leq x$
- $x \leq 1$
- $y \geq -2$

Use the grid below to show the region that Rafi needs to paint.

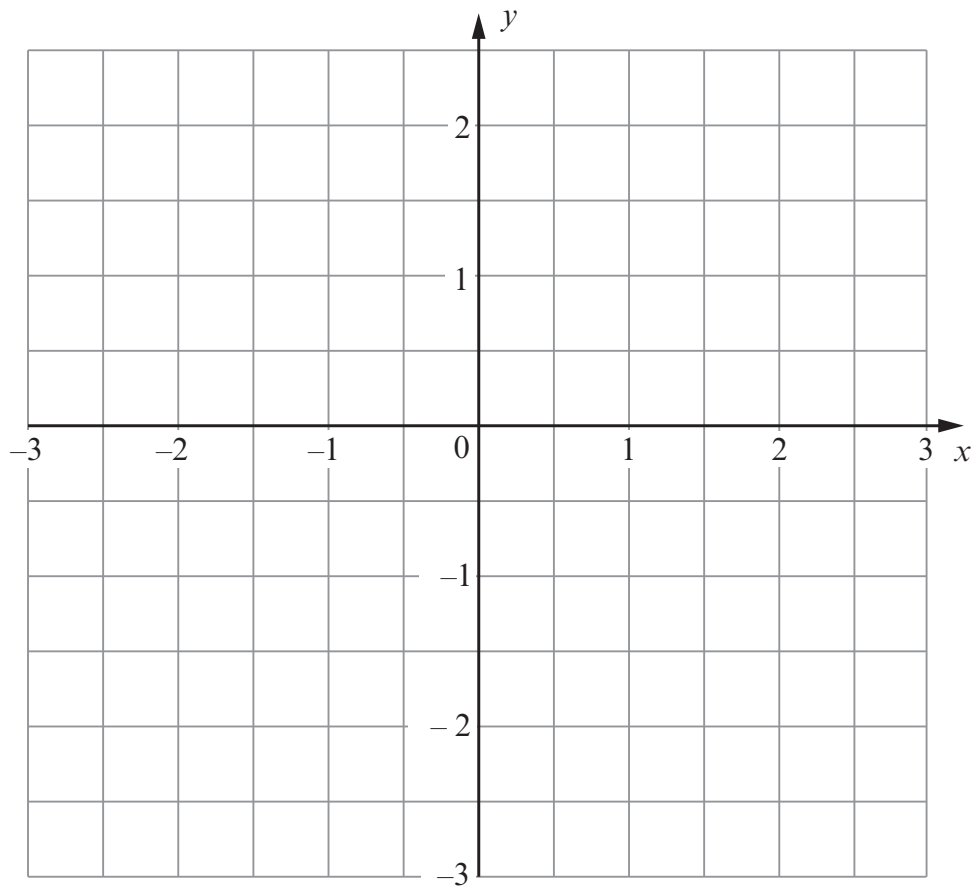
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[3]





(b) Solve  $8x < 3x + 40$ .

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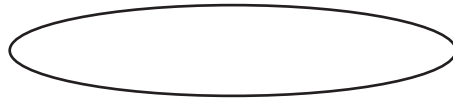
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[2]





(b) Catrin's necklace string is 80 cm long.



How many extra cubic beads can Catrin place on her necklace?

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[2]



8. (a) Arrange the following numbers in ascending order.

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 $2.4 \times 10^{-3}$  $2.4 \times 10^3$  $10^3$ 

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Smallest ..... Largest

[2]

(b) Evaluate  $6 \times 10^{13} + 9 \times 10^{13}$ , giving your answer in standard form.

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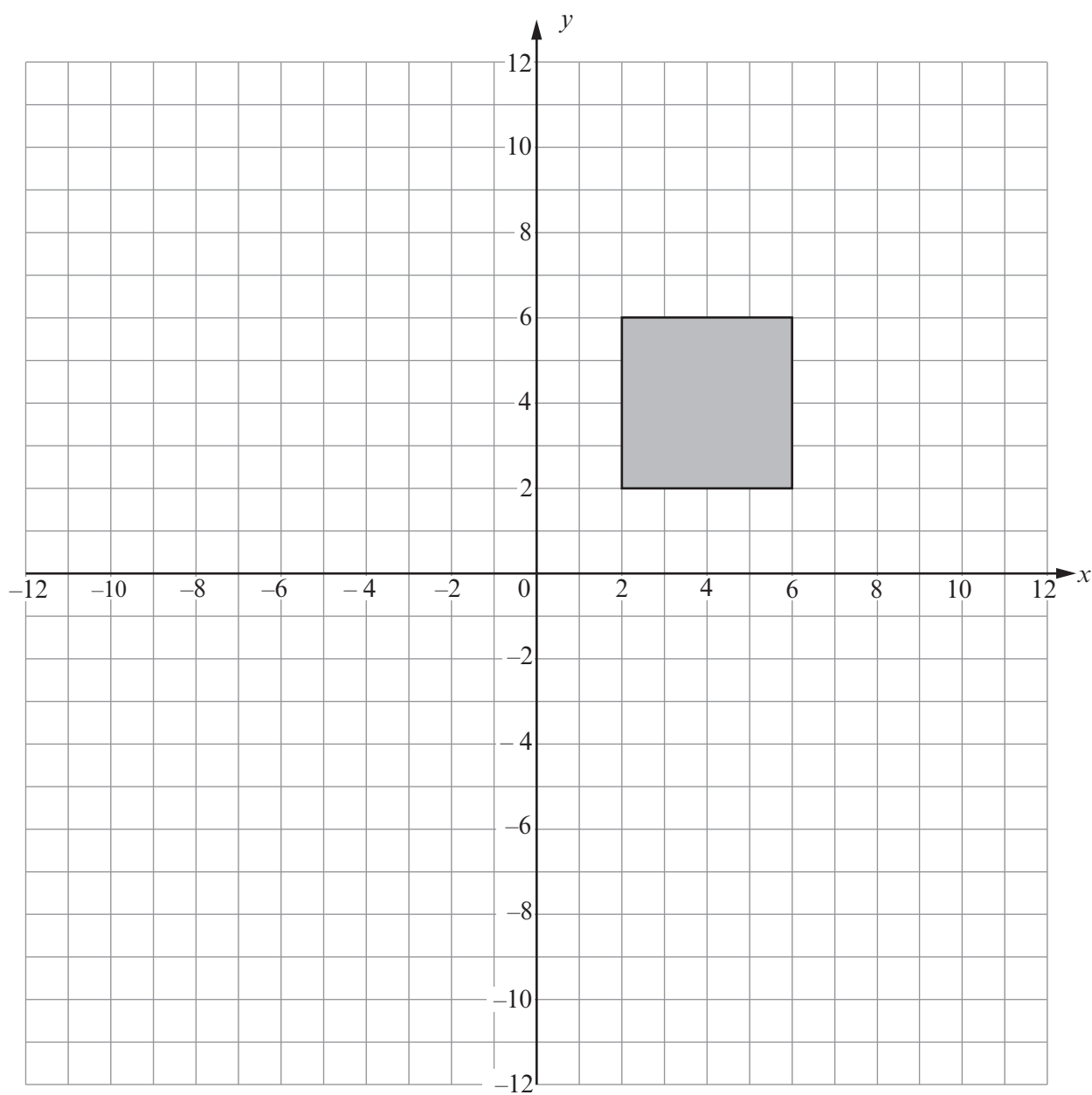
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[2]





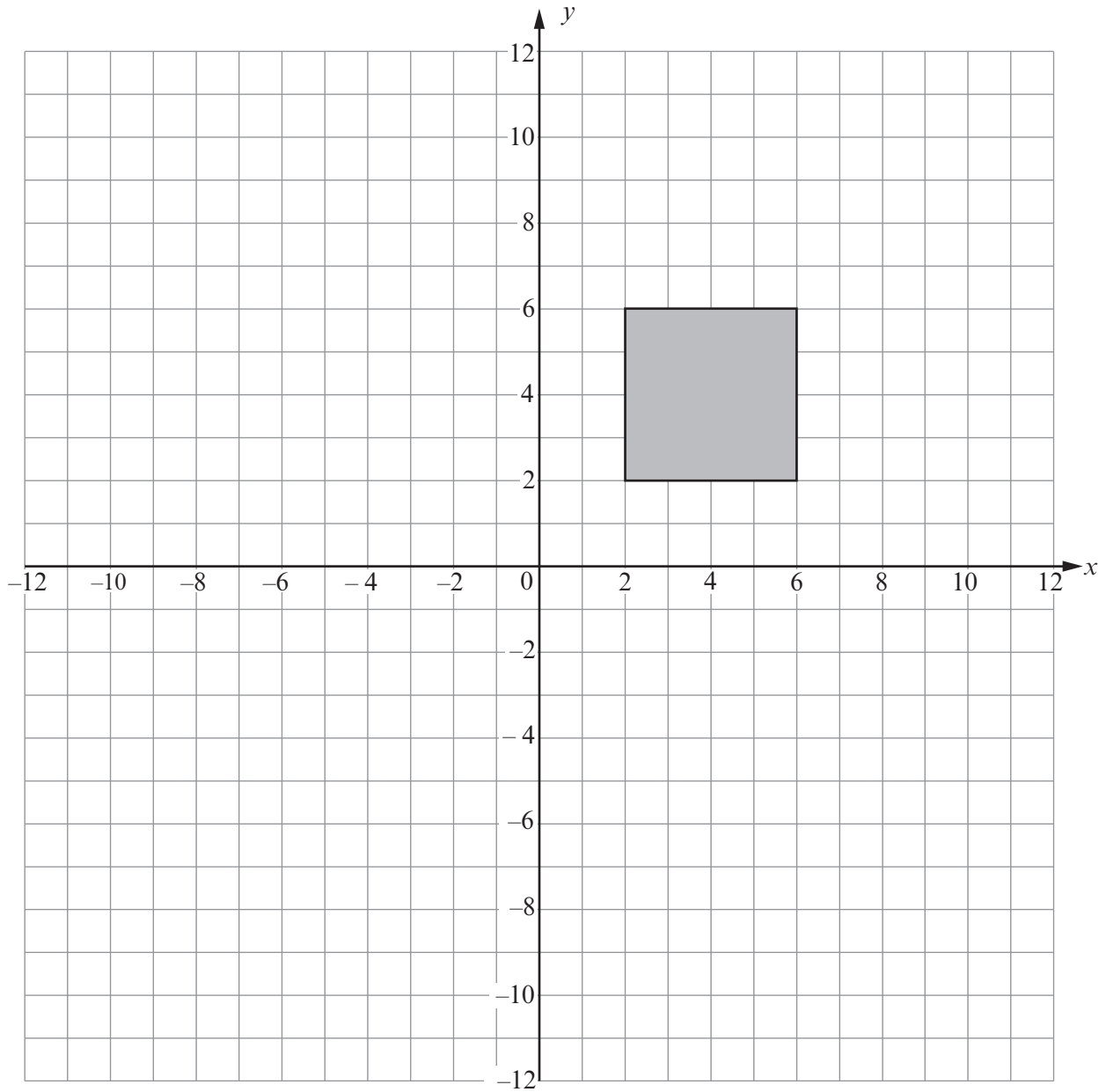
10. (a) Rotate the square through  $90^\circ$  clockwise about the point  $(2, 1)$ .



[2]



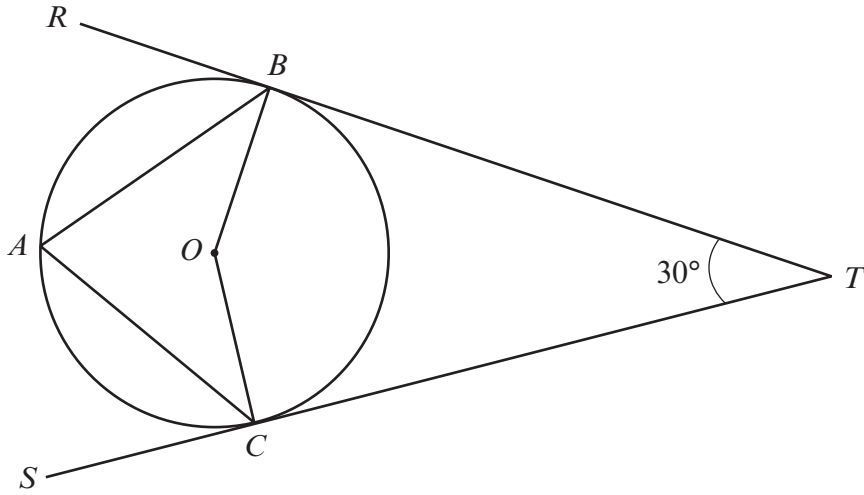
- (b) Enlarge the square shown on the grid below by a scale factor of  $-\frac{1}{2}$  using  $(0, 0)$  as the centre of enlargement.



[2]



11. The diagram shows a circle with centre  $O$ .  
The straight lines  $RT$  and  $ST$  are tangents to the circle, meeting the circle at  $B$  and  $C$  respectively.



*Diagram not drawn to scale*

Given that  $\widehat{BTC} = 30^\circ$ , calculate the size of  $\widehat{BAC}$ .  
You must give reasons in your solution.

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[4]





12. (a) Evaluate  $19^0$ .

[1]

(b) Find the value of  $(\sqrt{80} - \sqrt{5})^2$ .

[3]

(c) Express  $0.4\dot{2}8$  as a fraction.

[2]

(d) Simplify  $(\pi + 3)(\pi - 3)$ .  
Give your answer in terms of  $\pi$ .

[2]



13. A bowl contains 25 beans.  
There are 6 kidney beans, 9 pinto beans and 10 black-eyed beans.  
Two beans are selected at random from the bowl, without replacement.

(a) Calculate the probability that both of the beans are black-eyed beans.

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[2]

(b) Calculate the probability that at least one pinto bean is selected.

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[3]

**END OF PAPER**





