

Surname	Centre Number	Candidate Number
Other Names		0



**GCSE**

4352/02

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

A.M. FRIDAY, 14 June 2013

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

<p><b>CALCULATORS ARE NOT TO BE USED FOR THIS PAPER</b></p>
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**ADDITIONAL MATERIALS**

A ruler, a protractor and a pair of compasses may be required.

**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 3.

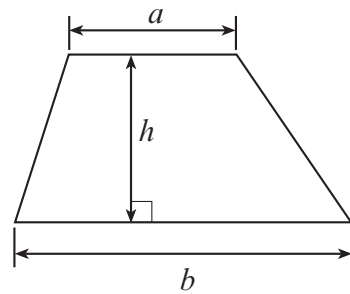
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	2	
2	7	
3	8	
4	6	
5	10	
6	6	
7	6	
8	7	
9	6	
10	4	
11	3	
<b>TOTAL MARK</b>		



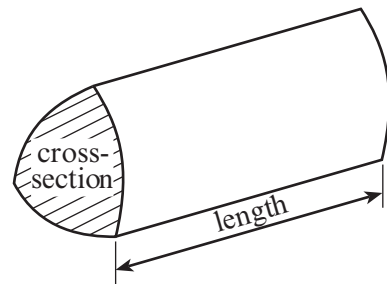
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### Formula List

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

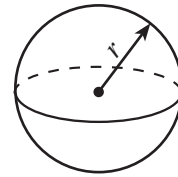


**Volume of prism** = area of cross-section  $\times$  length



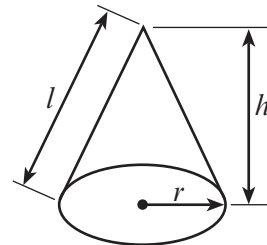
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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



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

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

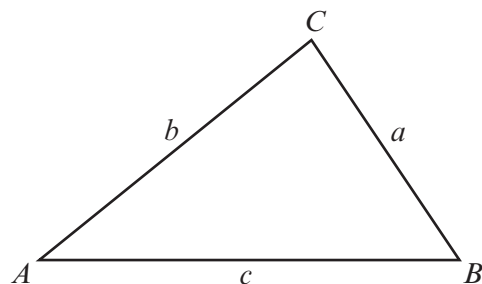


**In any triangle ABC**

**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

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



1. Sioned's trundle wheel display reads 0.0756 km.



What is this measurement in centimetres?

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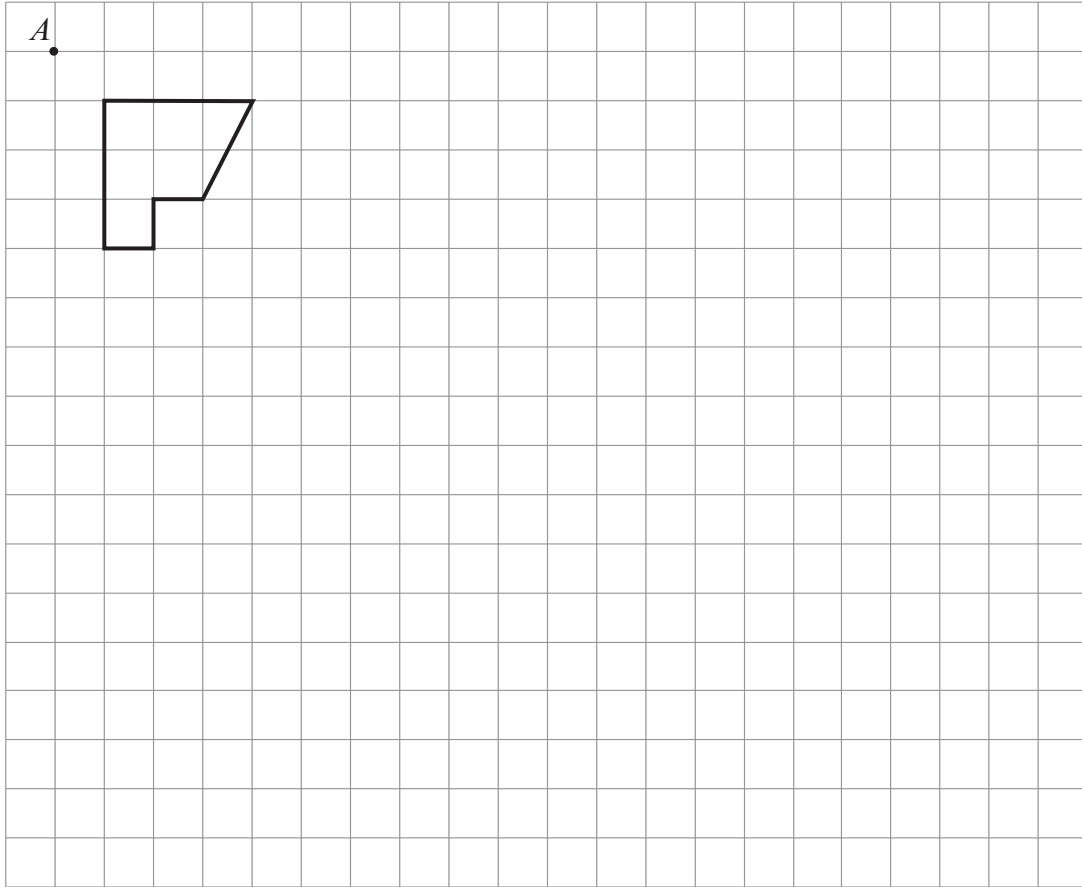
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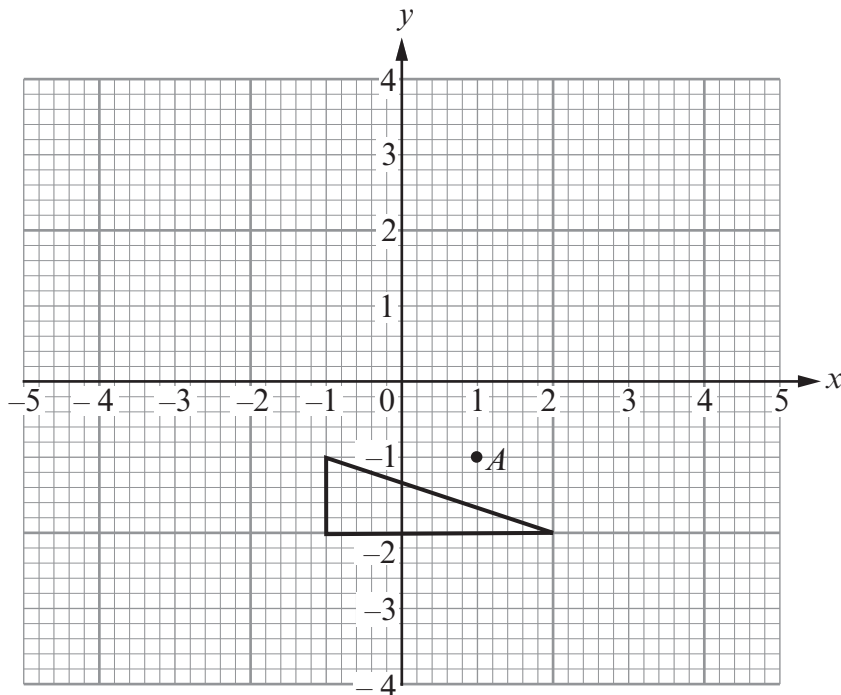
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2. (a) On the grid below, draw the enlargement of the given shape, using a scale factor of 3 and centre  $A$ . [3]

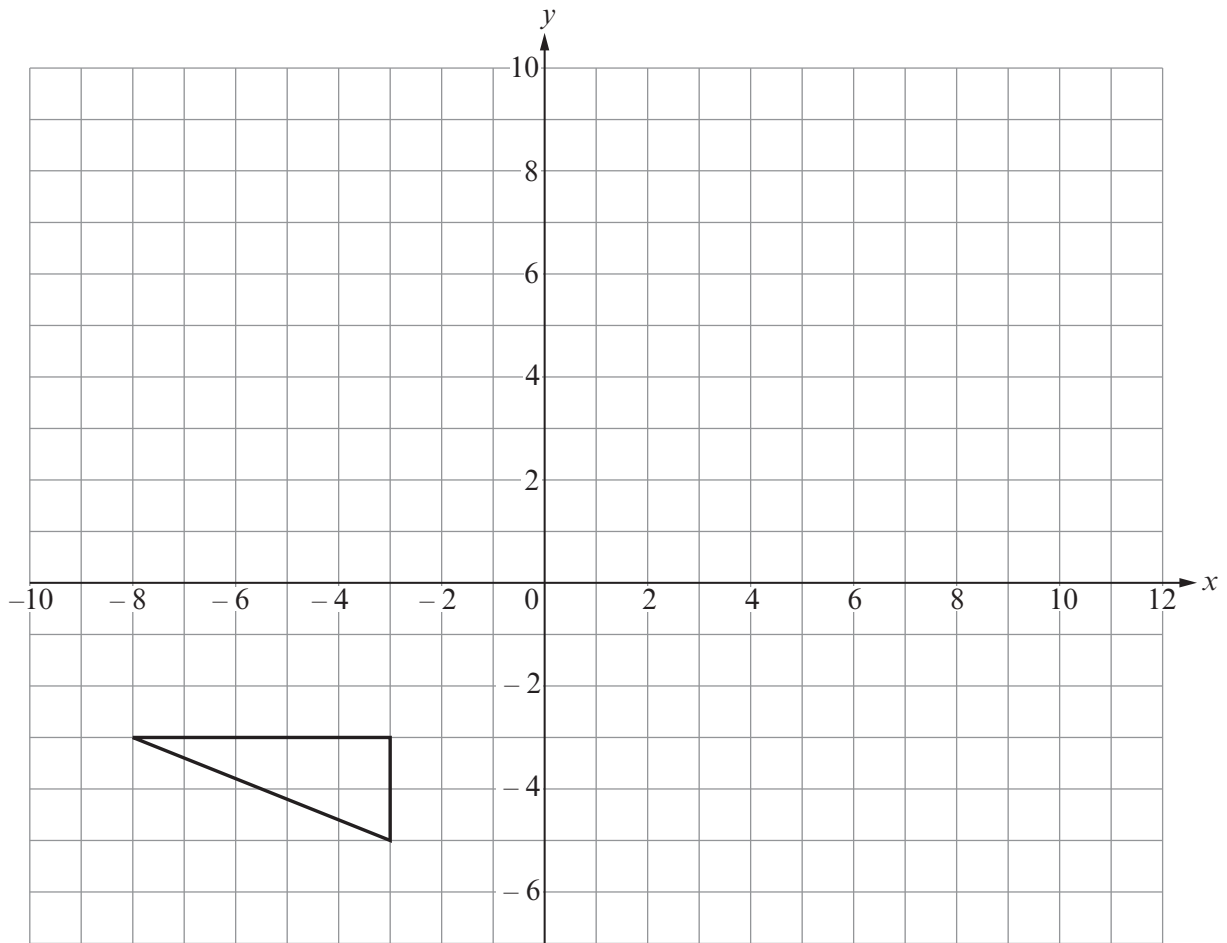


- (b) Rotate the triangle through  $90^\circ$  anticlockwise about the point  $A(1, -1)$ . [2]



(c) Draw the reflection of the triangle in the line  $y = 2$ .

[2]





4. (a) (i) Express 3969 as a product of prime numbers in index form.

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[3]

- (ii) Explain how you know that 3969 is a perfect square.

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[1]

- (b) Find the  $n$ th term of the following sequence of numbers.

8, 20, 32, 44, 56, ....

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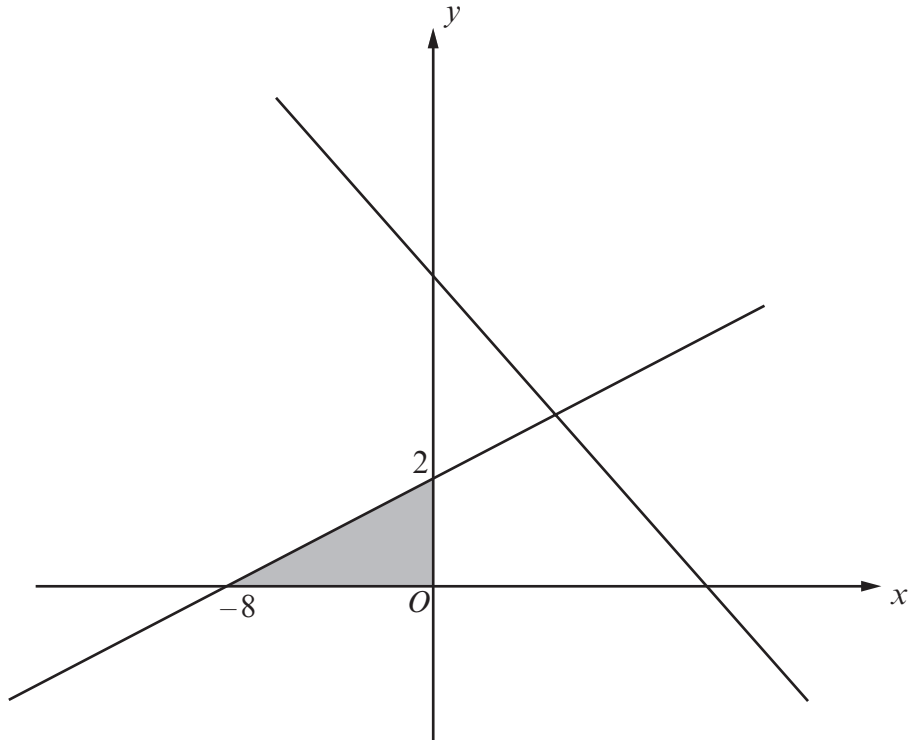
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[2]



5. (a) Mel is designing a new logo for her company. She starts with an  $x$ -axis and a  $y$ -axis. She sketches two straight lines and shades a region. This shape will become a part of the company logo.



*Diagram not drawn to scale*

Find the three inequalities that define the shaded region.

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[6]







6. Yasmin carried out an experiment.  
In the experiment, she shot 10 balls at a target and recorded the number of shots hitting the target.  
She carried out this experiment 6 times.  
The results are shown in the following table.

Experiment	1st	2nd	3rd	4th	5th	6th
Number of shots hitting the target	3	5	4	4	2	2

Yasmin decided to draw a graph showing the relative frequency of 'shots hitting the target' after 10 shots, 20 shots, 30 shots, 40 shots, 50 shots, 60 shots.

- (a) Use the graph paper opposite to draw the graph of the relative frequencies.

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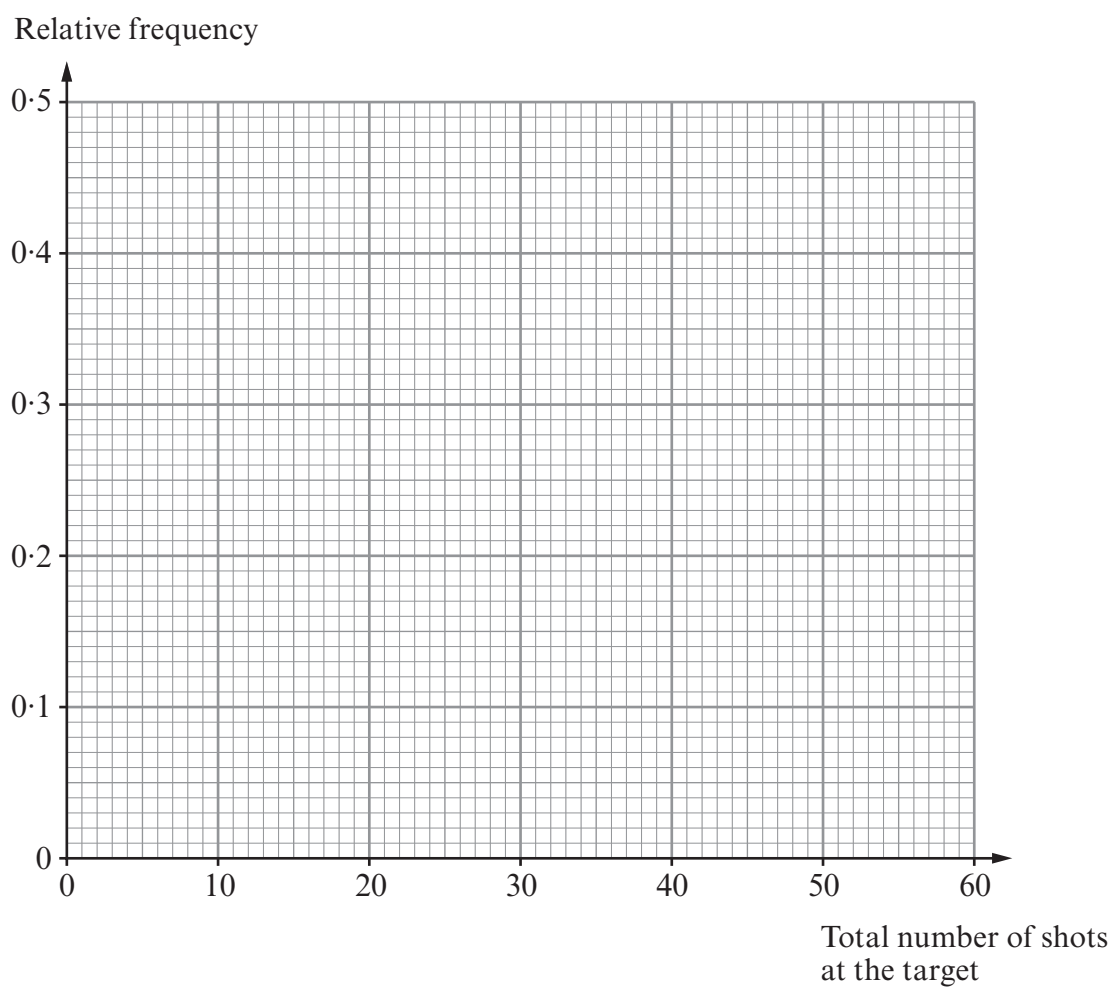
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[5]

- (b) Do you consider that the experiment has been carried out enough times to give a good estimate for the probability of a shot hitting the target?  
You must give a reason for your answer.

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[1]



7. (a) Kirra needs to write a formula in a spreadsheet.  
She needs a formula for  $g$  in terms of  $f$ .

Kirra knows that  $f = 5 + 3g^2$ .

Rearrange to make  $g$  the subject of the formula.

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[3]

- (b) Expand and simplify  $(2x + 5y)(4x - 3y)$ .

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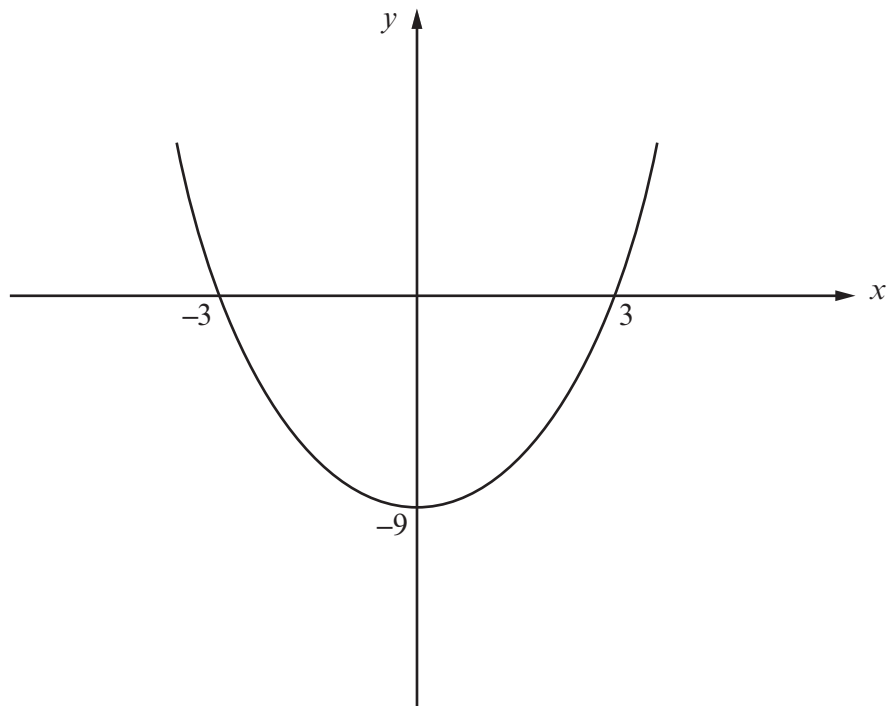
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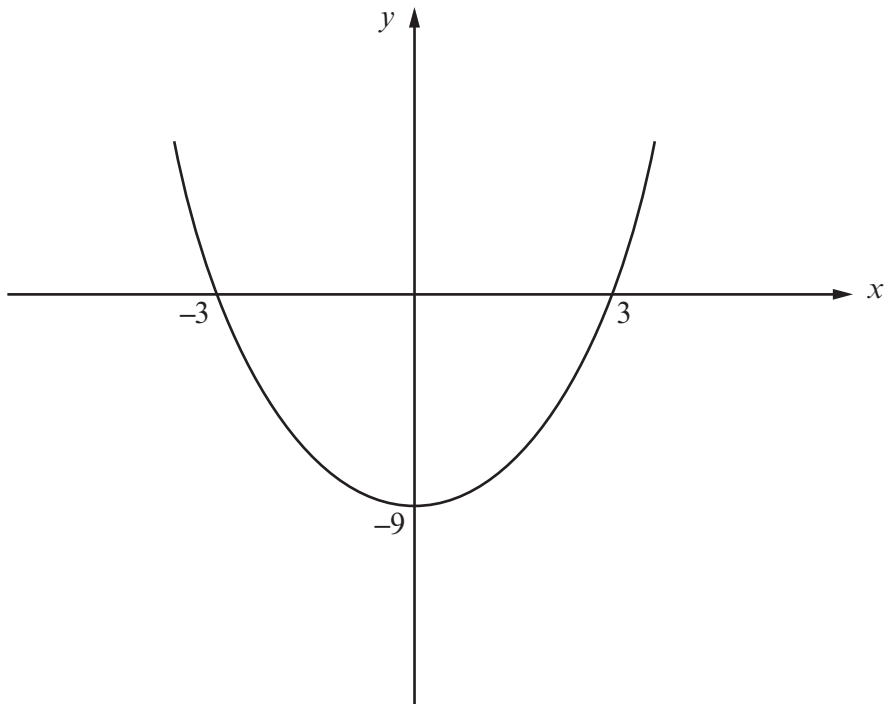


9. (a) The diagram shows a sketch of  $y = f(x)$ .  
On the same diagram, sketch the curve  $y = f(x) - 3$ .  
Mark clearly the coordinates of the point where the curve crosses the  $y$ -axis.



[2]

- (b) The diagram shows another sketch of  $y = f(x)$ .  
(i) On the same diagram, sketch the curve  $y = f(x + 3)$ .  
Mark clearly the coordinates of any points where the curve crosses the  $x$ -axis.



[2]

- (ii) State the minimum value of  $y = f(x + 3)$ .

Minimum value is .....

[1]



- (c) The function  $y = f(x)$ , as shown in the original sketches, represents one of the following equations.  
State which of the following equations it is.

$$y = 3x - 9$$

$$y = x^2 + 9$$

$$y = x^3$$

$$y = x^2 - 9$$

$$y = 3x^2$$

$$y = -x^2 - 9$$

$$y = x^3 + 9$$

$$y = -x^2 + 9$$

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[1]







11. A bag contains 21 raffle tickets, 16 of which are white, 4 are yellow and 1 is purple. Two raffle tickets are drawn at random without replacement from the bag. Calculate the probability that at least one white raffle ticket is drawn. You **must** give your answer as a fraction in its simplest form.

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[3]

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