Surname	Centre Number	Candidate Number
Other Names		0

WJEC CBAC

New GCSE

4352/02

MATHEMATICS (UNITISED SCHEME)
UNIT 2: NON-CALCULATOR MATHEMATICS
HIGHER TIER

P.M. THURSDAY, 17 November 2011

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

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

4352 020001

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.

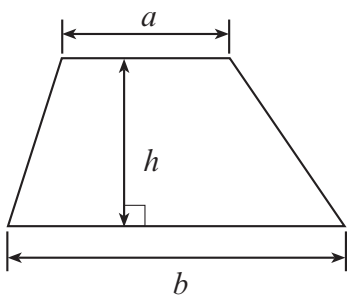
The number of marks is given in brackets at the end of each question or part-question.

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

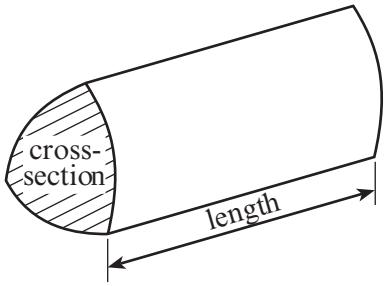
For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**2**	
2	**5**	
3	**3**	
4	**8**	
5	**7**	
6	**6**	
7	**6**	
8	**3**	
9	**4**	
10	**4**	
11	**2**	
12	**4**	
13	**5**	
14	**6**	
TOTAL MARK		

Formula List

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

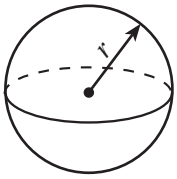


Volume of prism = area of cross-section × length



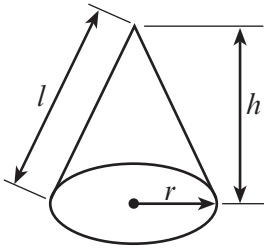
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

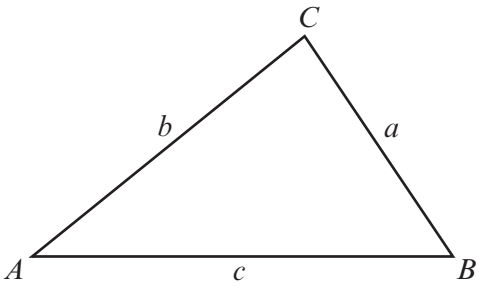


In any triangle ABC

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



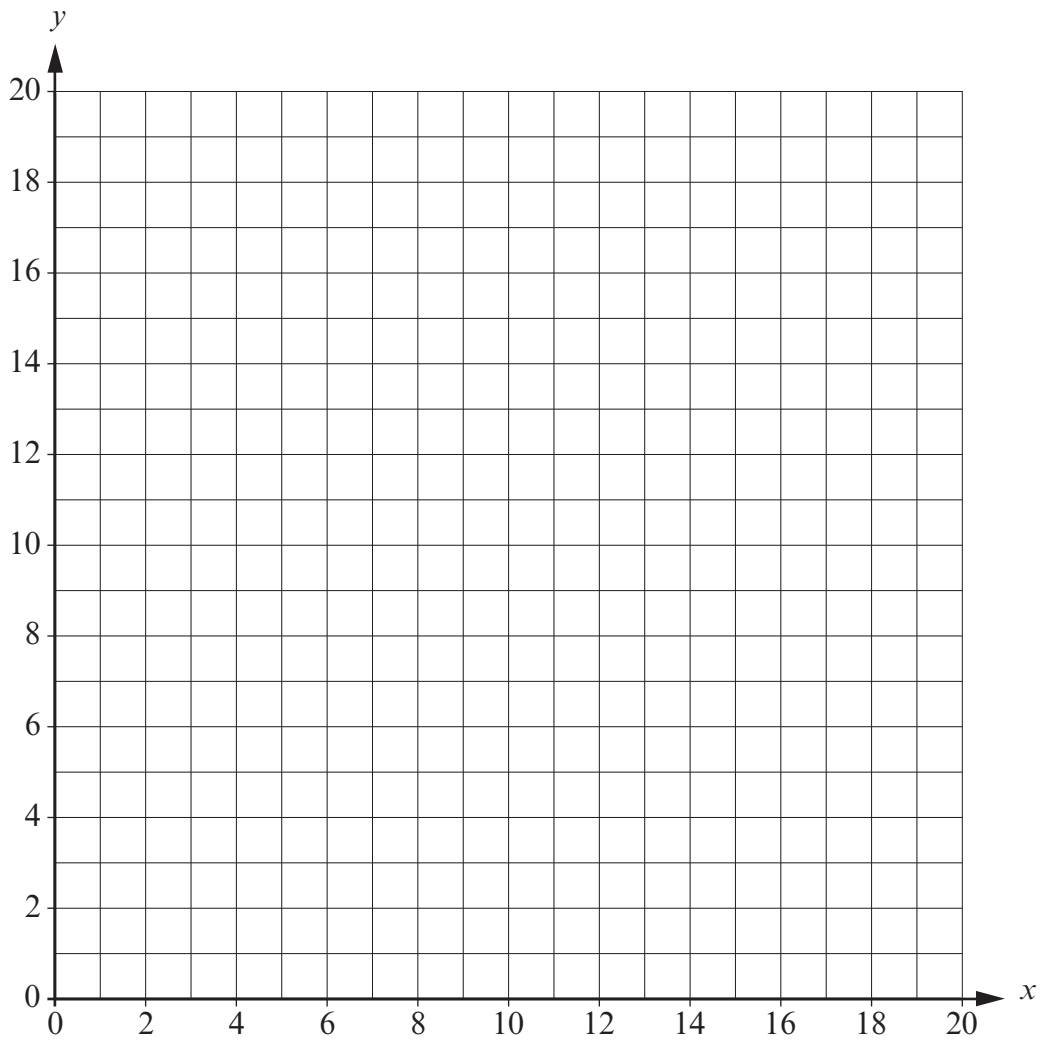
The Quadratic Equation

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. Three vertices of a parallelogram are at (6, 18), (3, 2), and (14, 2). Find the coordinates of the fourth vertex of the parallelogram, which lies on the grid shown below.



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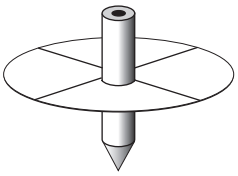
Co-ordinates of the 4th vertex (..... , ...)

[2]

Examiner only

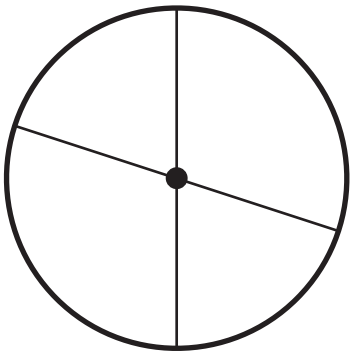
2. Sophie has a spinner.



The spinner is coloured so that

- **Red** is opposite **White,** and
- **Yellow** is opposite **Purple**.

The disc of the spinner is as shown below, with two straight lines passing through the centre of the spinner.



A table to show the probabilities of Sophie obtaining **Red**, **White**, **Yellow** and **Purple** has been started.
Complete the table and indicate how the disc should be coloured by labelling each sector.

Colour	**Red**	**White**	**Yellow**	**Purple**
Probability	0·2			

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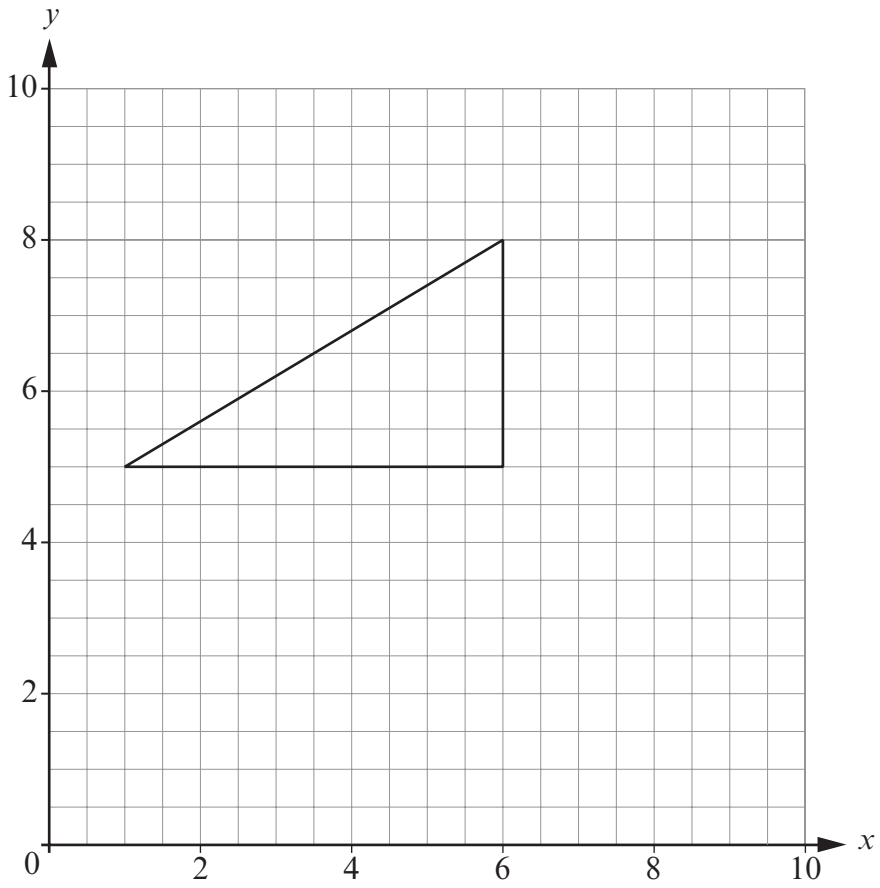
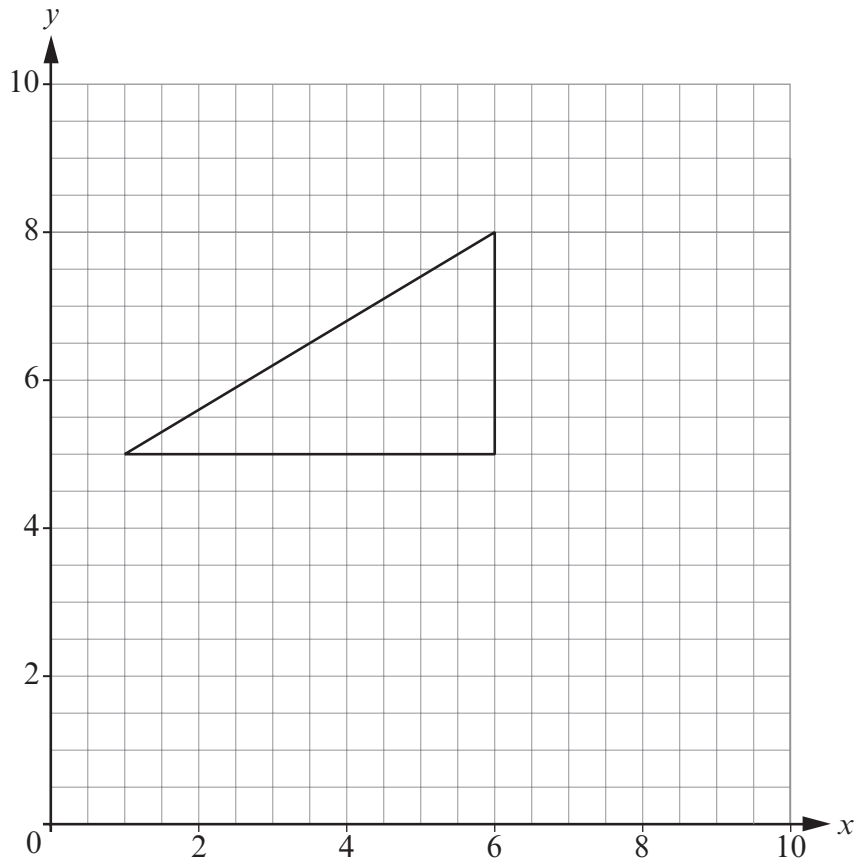
[5]

Examiner only

3. *(a)* Draw the reflection of the triangle below in the line $y = 4$. [2]



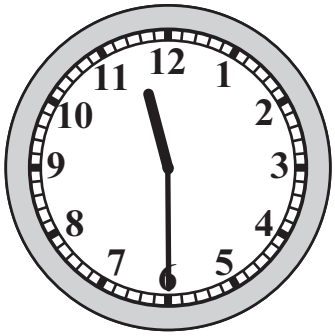
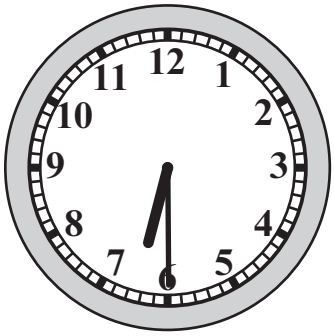
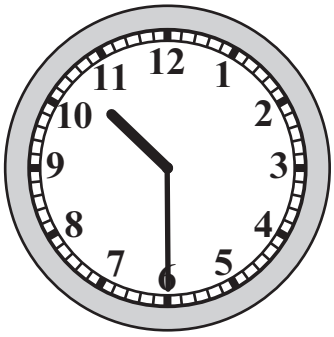
(b) Translate the triangle below by 2 units to the right and 4 units down. [1]



Examiner only

4. *(a) You will be assessed on the quality of your written communication in this part of the question.*

Some mobile phones show a number of world clocks.

London	New York	Sydney
		
Monday 11:30	Monday 06:30	Monday 22:30

When it is 3 p.m. on Wednesday in New York, what day and time will it be in Sydney? Explain your reasoning.

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[5]

(b) Some mobile phones can convert measurements.
Convert 600 metres per minute to kilometres per hour.
You must show all your working.

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[3]

5. *(a)* Solve $4 - x > 7$.

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[2]

(b) A garage has x new cars and three times as many used cars for sale.
The total number of cars for sale is 84.
Write down an equation in x and solve it to find the number of new cars for sale.

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[2]

(c) When a number n is added to 7 the total is greater than 11.

(i) Write down and simplify an inequality which is satisfied by n.

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[2]

(ii) Find the least whole number value of n.

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[1]

Examiner only

6. *(a)* Write down $\sqrt[3]{125}$.

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[1]

(b) Write down the reciprocal of a quarter.

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[1]

(c) Express 112 as a product of prime numbers in index form.

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[3]

(d) Explain how you know that 32 is **not** a square number.

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[1]

Examiner only

7. *(a)* Write down the *n*th term of the sequence 11, 15, 19, 23, 27, ...

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[2]

(b) Write down the next two numbers in this sequence.

98, 87, 78, 71, 66, ..., ...

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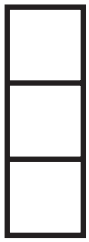
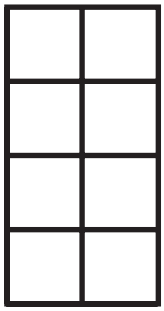
[1]

(c)

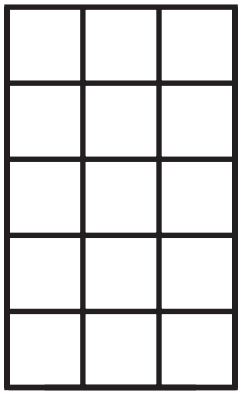
Pattern 1



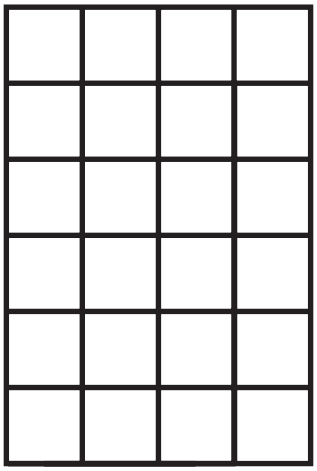
Pattern 2



Pattern 3



Pattern 4



Pattern 1 is made using 3 small squares.
Pattern 2 is made using 8 small squares.
Find the number of small squares in Pattern *n*.

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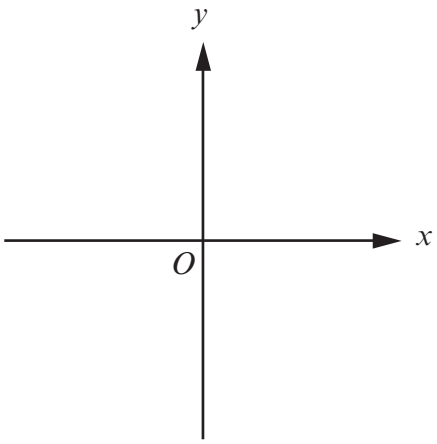
[3]

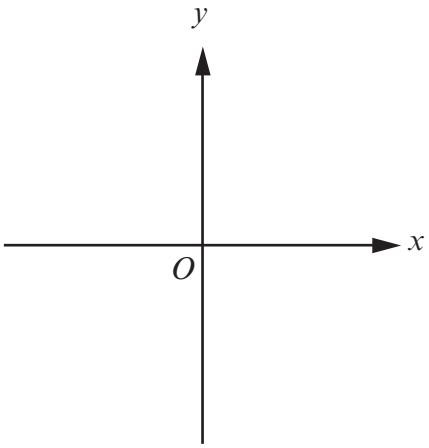
Examiner only

8. Use the axes below to sketch the graph of each of the following equations.

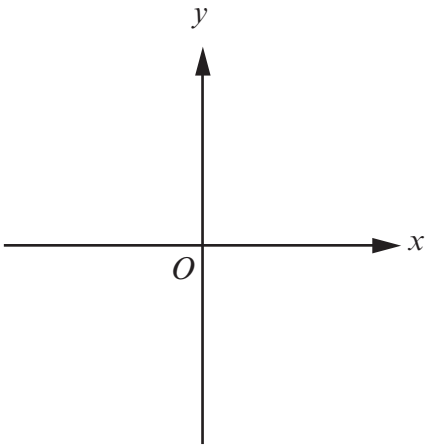
$y = x^2$



$y = \frac{1}{x}$



$y = x^3$



[3]

Examiner only

9. On the graph paper below, draw the region which satisfies **all** of the following inequalities.

$$\begin{aligned} y &\leqslant 5 \\ x + y &\leqslant 4 \\ x &\leqslant 3 \\ x + y &\geqslant 0 \end{aligned}$$

Make sure that you clearly indicate the region that represents your answer.

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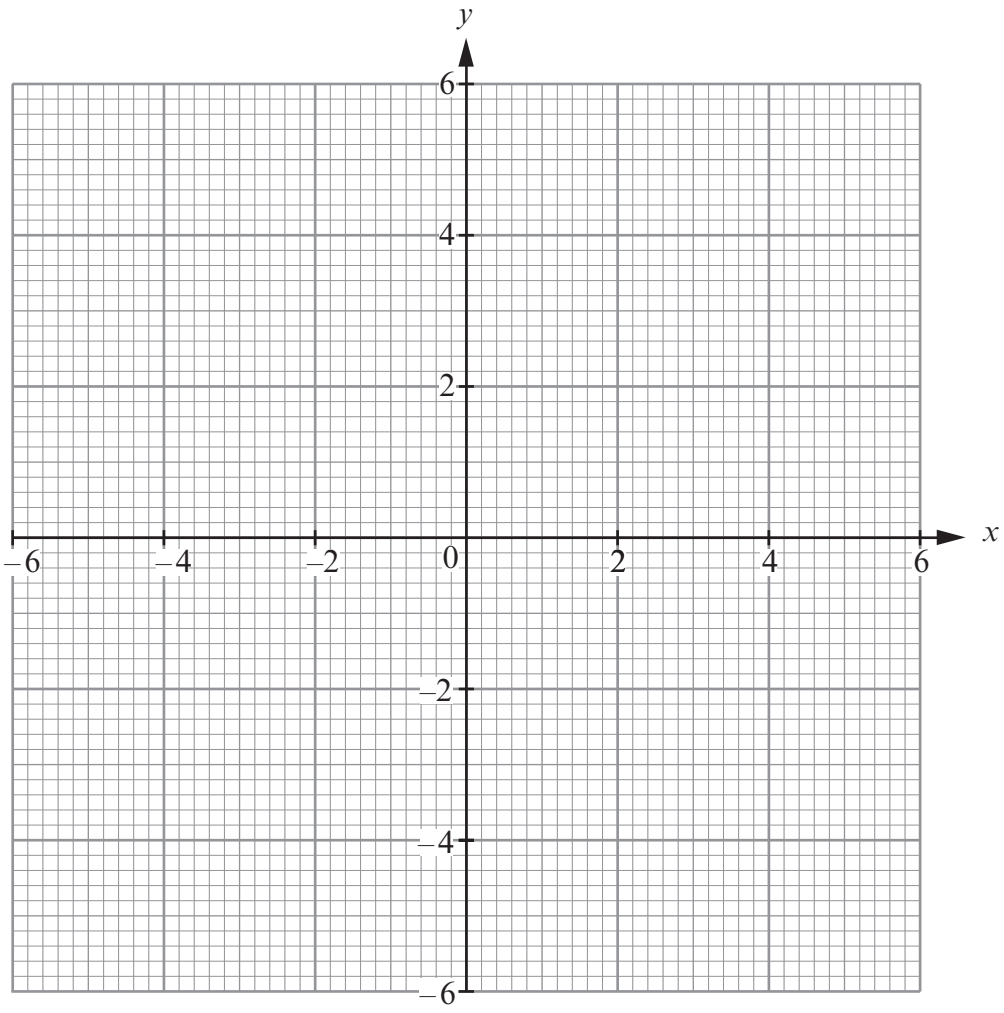
[4]



Turn over.

Examiner only

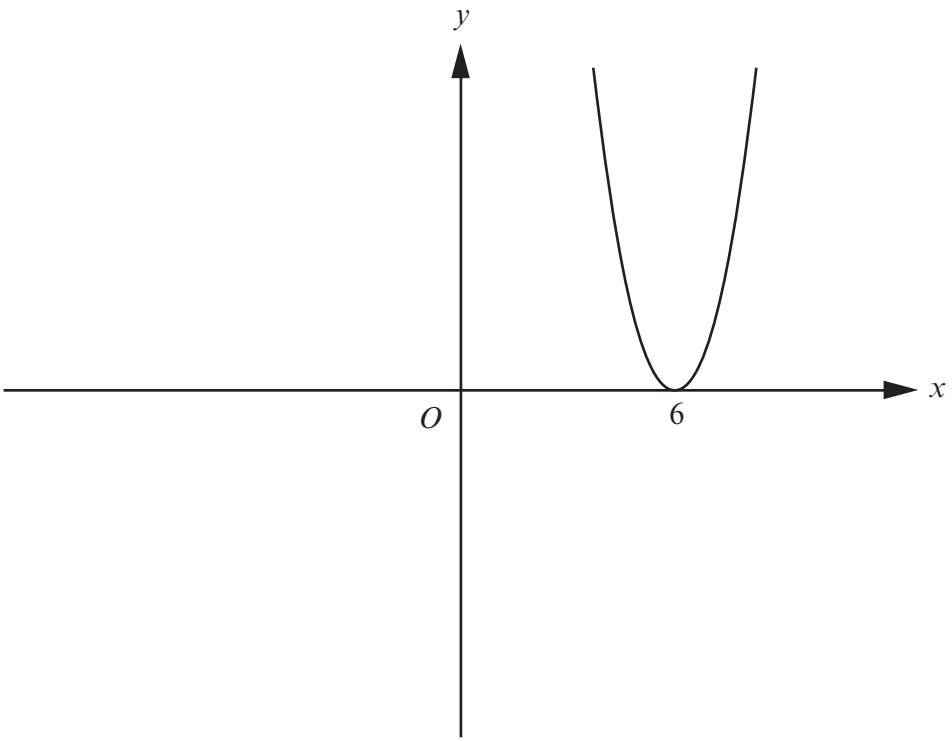
10. Solve the following simultaneous equations using an algebraic (not graphical) method.

$$3x + 5y = 9$$
$$4x + 3y = 23$$

[4]

Examiner only

11. The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = f(x - 3)$.
Mark clearly the value of x at the point where this curve touches the x-axis.



[2]

Turn over.

Examiner only

12. The diagram shows a circle with centre O.
PAQ and RCQ are tangents to the circle.
A, B, C and D are points on the circumference of the circle.

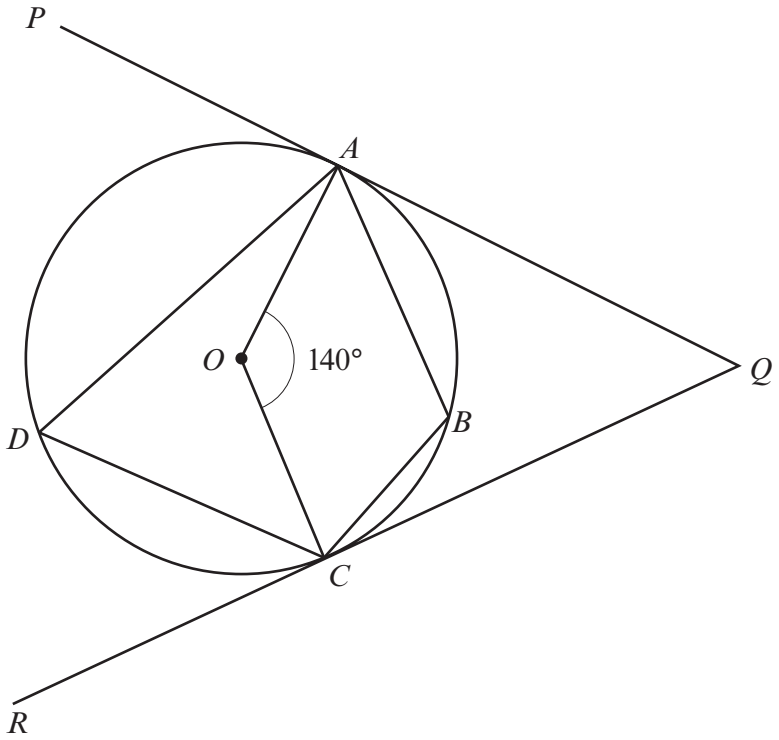


Diagram not drawn to scale

(a) Write down a line that is equal in length to AQ and state a reason for your answer.

$AQ =$ .....

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[2]

(b) Calculate the size of $A\hat{B}C$ and give reasons for your answer.

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[2]

Examiner only

13. *(a)* Express $0\cdot\dot{7}\dot{6}\dot{4}$ as a fraction.

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[2]

(b) Simplify $(5 - 3\sqrt{2})^2$ and state whether your answer is rational or irrational.

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[3]

Examiner only

14. One hundred raffle tickets are sold.
The tickets sold are numbered from 1 to 100.
The raffle tickets are placed in a drum.
Two raffle tickets are selected at random, one ticket at a time, and not replaced in the drum.

(a) Find the probability that one of the tickets drawn is even and the other is odd.

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[3]

(b) Find the probability that at least one of the tickets drawn is even.

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[3]