Surname	Centre Number	Candidate Number
Other Names		0

GCSE

4352/02

MATHEMATICS (UNITISED SCHEME)

UNIT 2: Non-Calculator Mathematics
HIGHER TIER

A.M. FRIDAY, 8 November 2013

1 hour 15 minutes

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

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.

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 **1**.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**7**	
2.	**3**	
3.	**4**	
4.	**4**	
5.	**4**	
6.	**3**	
7.	**3**	
8.	**3**	
9.	**7**	
10.	**3**	
11.	**5**	
12.	**5**	
13.	**7**	
14.	**2**	
15.	**5**	
Total	**65**	

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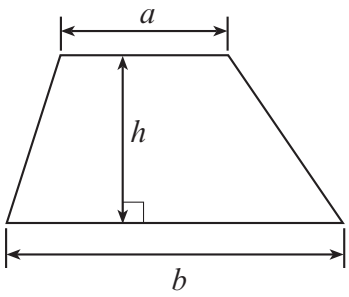
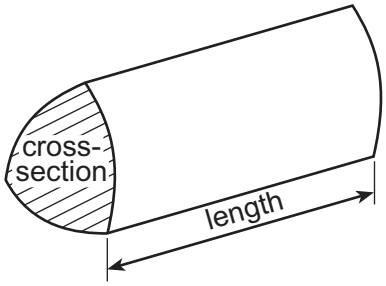
Formula List

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

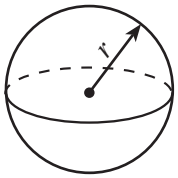


Volume of prism = area of cross-section × length



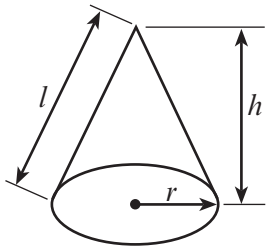
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

Curved surface area of cone = πrl

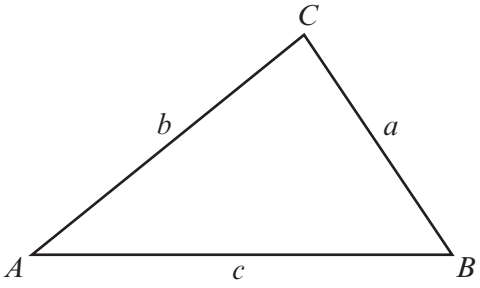


In any triangle ABC

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

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

Examiner only

1. *You will be assessed on the quality of your written communication in this question.*

Omar wants to buy a television from an online electrical store.

He can choose from two different payment options.

Option A: £580 + VAT at 20%
Option B: a deposit of £120, followed by twelve equal monthly payments of £49.50

Which option is cheaper, and by how much?
You must explain your reasoning and show all your working. [7]

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Examiner only

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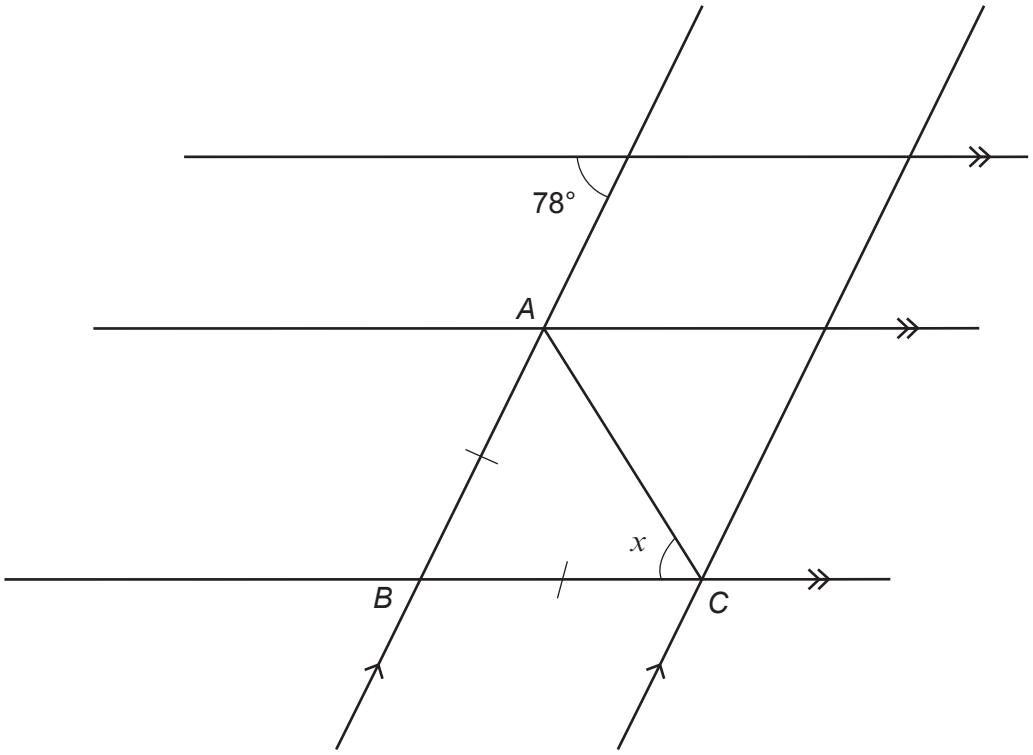

Diagram not drawn to scale

In the diagram above, *AB* = *BC*.

Find the value of x.

You must show all the steps of your working. [3]

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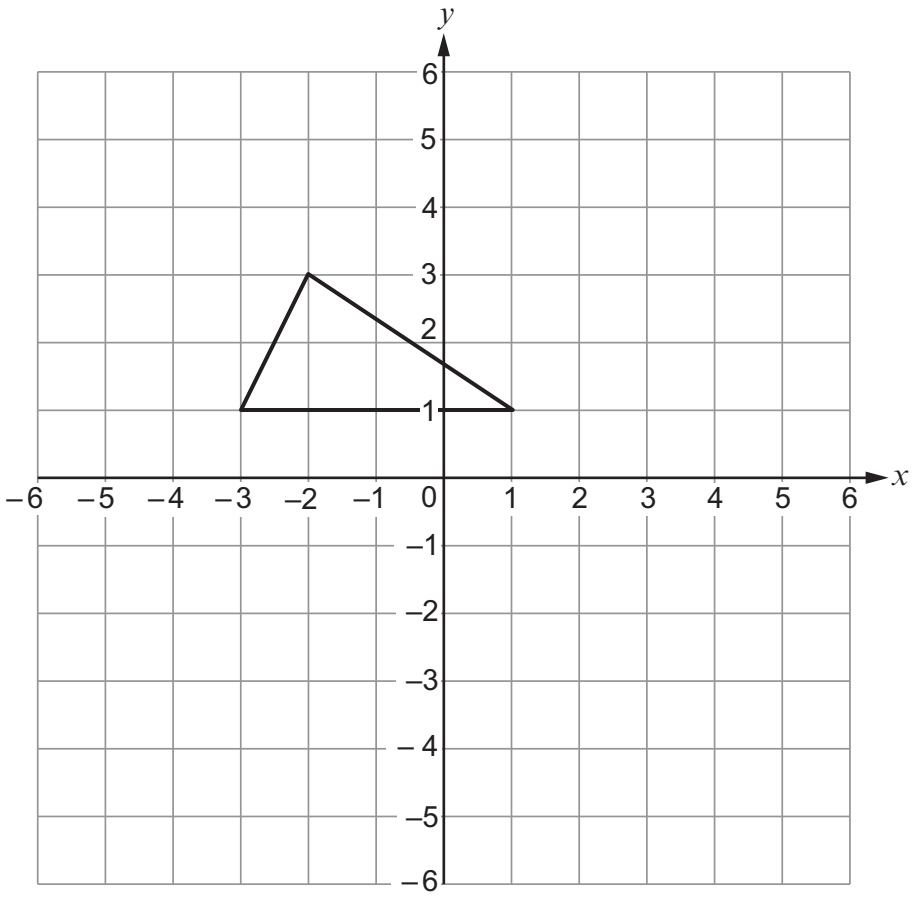
$x =$ ..... °

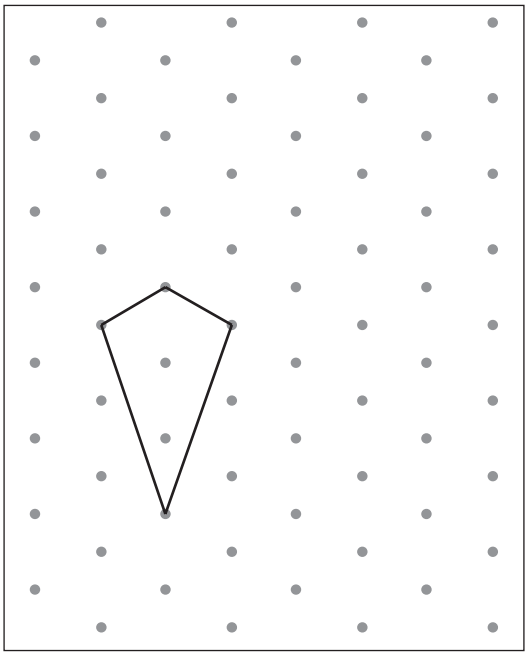
Examiner only

3. *(a)* Reflect the triangle in the line $y = -1$. [2]



(b) Elin has bought a box of kite-shaped tiles to decorate part of her bathroom wall. She does not intend to use tiles of any other shape on this part of the wall.

A scale drawing of one of the tiles has been drawn on the isometric grid below. Show how it is possible to tessellate the tiles. You should draw at least **seven** additional shapes. [2]



Examiner only

4. *(a)* Simplify

(i) $3t^2 \times 4t^7$, [1]

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(ii) $\frac{p^8}{p^2}$. [1]

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(b) Solve the inequality $7x < 72 - x$. [2]

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Examiner only

5. *(a)* Express 396 as a product of prime numbers in index form. [3]

(b) Write down the smallest positive integer which should be **divided** into 396 to produce a perfect square. [1]

6. Showing all your working, **estimate** the value of

$$\frac{895{\cdot}7 \times 0{\cdot}108}{0{\cdot}315^2}$$ [3]

Examiner only

7. The village of Sumston is organising a Spring Fayre to raise money for the local community centre.

(a) In the 'lucky dip', everyone wins either a toy, a pen or a pencil.
The probabilities of winning the different prizes are given in the following table.

Prize	Toy	Pen	Pencil
Probability	x	$3x$	$16x$

Find the value of x. [2]

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(b) To promote the sale of raffle tickets at the Spring Fayre, a free second ticket is given with every ticket bought.

Stephen thinks this offer will double his chance of winning a prize.
Is Stephen correct?
You must explain your answer. [1]

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Examiner only

8. *(a)* Find the gradient of the line with equation $4y = 3x - 5$. [1]

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(b) On the graph paper below, draw the straight line with equation $x + 2y = 6$. [2]

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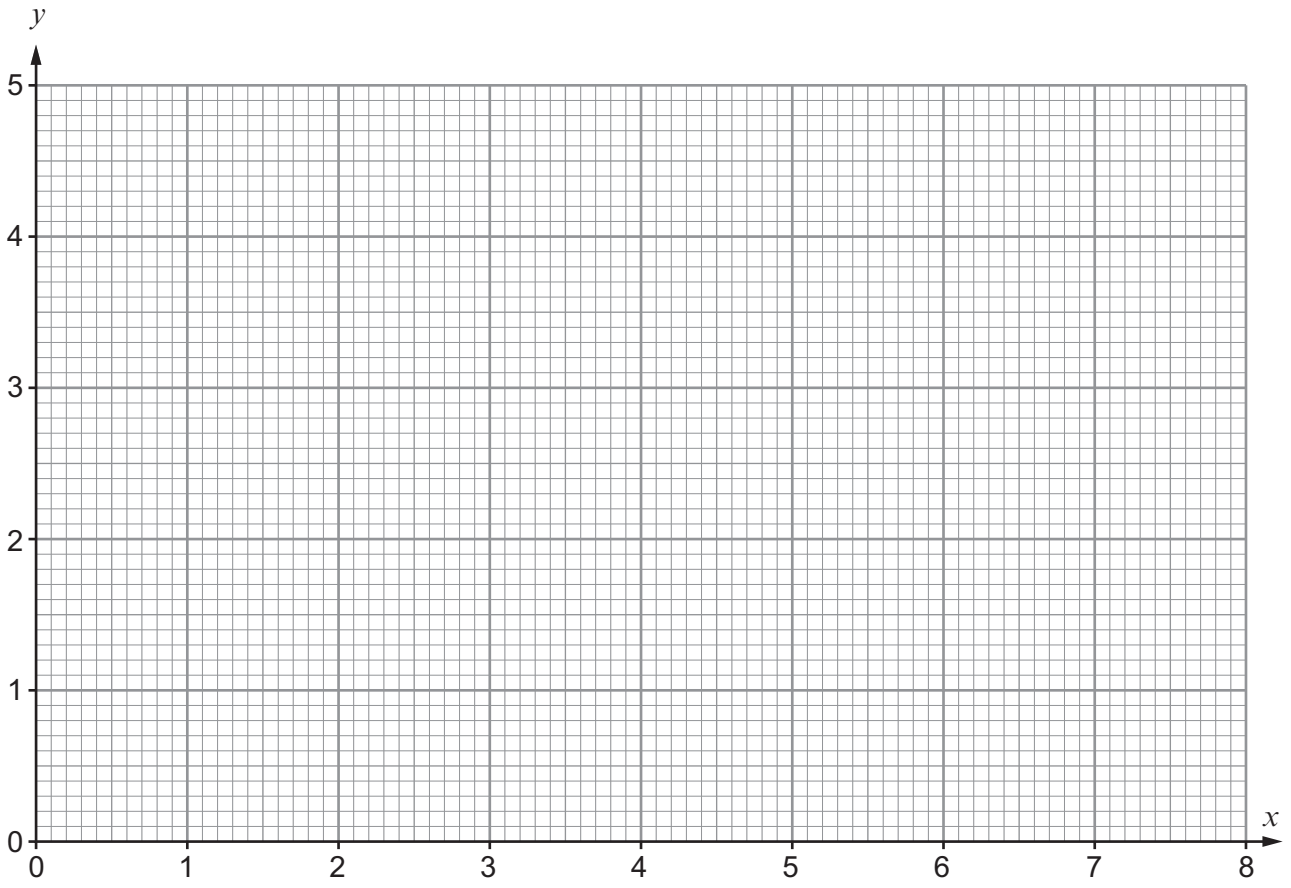

Examiner only

9. *(a)* Write down an expression for the nth term of each of the following sequences.

(i) 5, 13, 21, 29, 37, … [2]

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nth term .....

(ii) 0, 1, 4, 9, 16, 25, … [2]

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nth term .....

(b) Here are the first five terms of a descending sequence of numbers.

126, 122, 118, 114, 110, …

The nth term is given by $130 - 4n$.

Without listing any further terms of the sequence, find the value of n that gives the first negative term.

You must show your working. [3]

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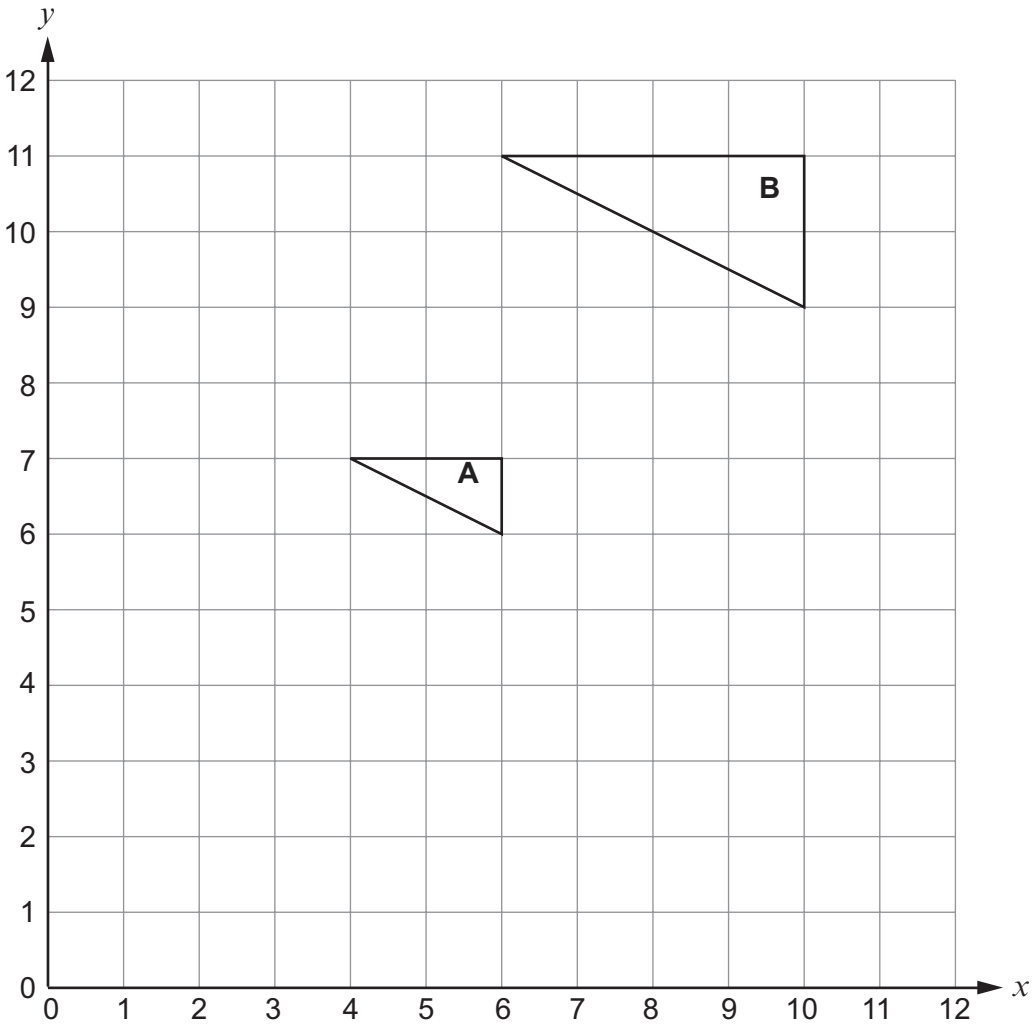
Examiner only

10. Describe **fully** the transformation which maps **triangle A onto triangle B**. [3]



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Examiner only

11. The Barrett family want to buy new seating for their living room.
Their local Sofa Bargain Centre sells the sofas and armchairs they have chosen.

The price of two large sofas and three armchairs is £2550.
The price of one large sofa and five armchairs is £2500.

How much would two large sofas and one armchair cost?
You must use an algebraic method and you must show all your working. [5]

Examiner only

12. The points, A, B, C and D lie on the circumference of a circle with centre O and $A\hat{D}C = 109°$.

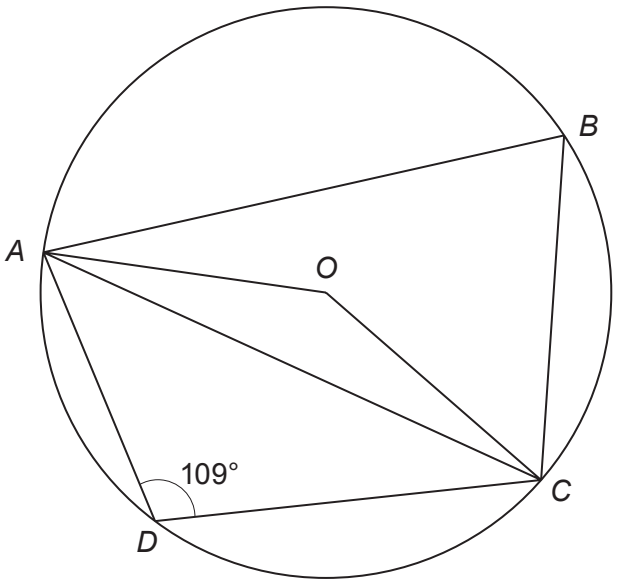


Diagram not drawn to scale

Giving reasons for your answers, calculate

(a) the size of $A\hat{B}C$, [2]

(b) the size of $A\hat{C}O$. [3]

Examiner only

13. *(a)* Express $0\cdot0\dot{8}$ as a fraction. [2]

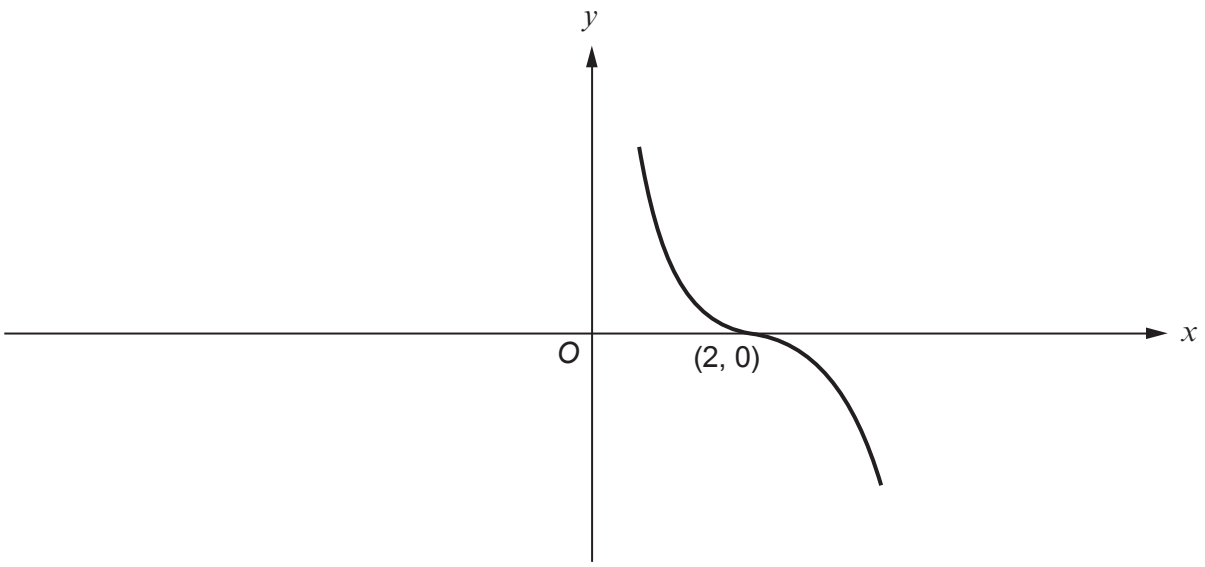
(b) Evaluate $16^{-\frac{1}{2}}$. [2]

(c) Evaluate $(\sqrt{20} - \sqrt{5})^2$ and state whether your answer is rational or irrational. [3]

Examiner only

14. 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 a point where this curve crosses an axis. [2]



Turn over.

Examiner only

15. At a children's party, the winner of each game picks a sweet at random out of a box. At the start of the party, the box contains 6 strawberry sweets, 3 lemon sweets and 1 blackcurrant sweet.

Assuming that no child returns a sweet to the box, find the probability that

(a) the winners of the first two games pick sweets of the same flavour, [3]

(b) the blackcurrant sweet is still in the box **after** the winners of the first three games have picked their sweets. [2]

END OF PAPER