

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

4352/02

MATHEMATICS (UNITISED SCHEME)

UNIT 2: Non-calculator Mathematics

HIGHER TIER

A.M. FRIDAY, 13 June 2014

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. 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 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 2(a).

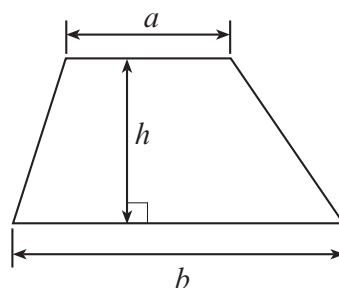
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	2	
2.	8	
3.	2	
4.	5	
5.	3	
6.	2	
7.	4	
8.	6	
9.	4	
10.	3	
11.	4	
12.	5	
13.	4	
14.	6	
15.	5	
16.	2	
Total	65	



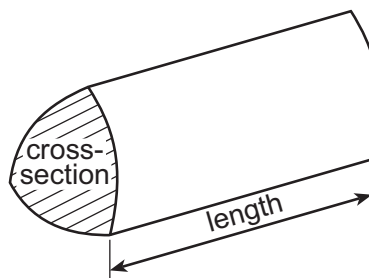
J U N 1 4 4 3 5 2 0 2 0 1

Formula List

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

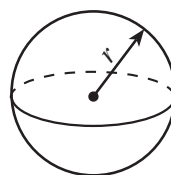


Volume of prism = area of cross-section \times length



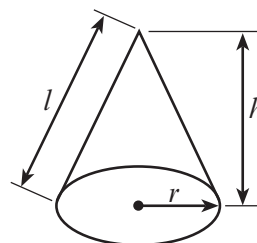
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

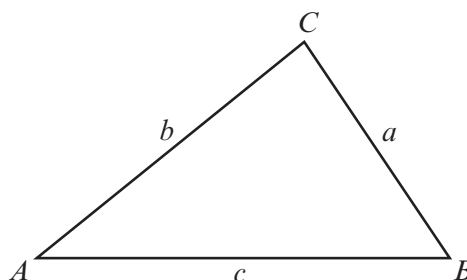


In any triangle ABC

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

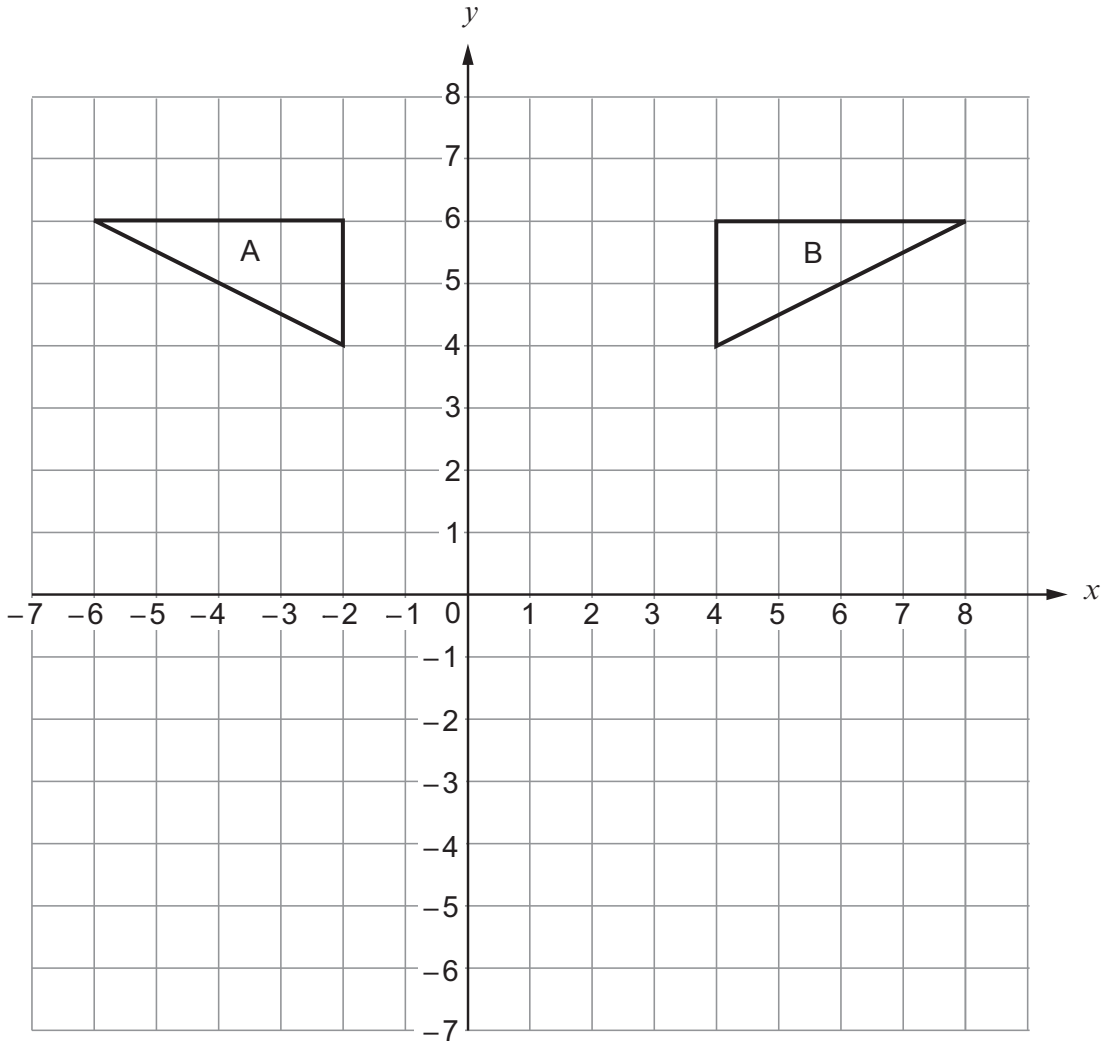
The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$ are given by

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



1. Describe **fully** the transformation which maps triangle A onto triangle B. [2]



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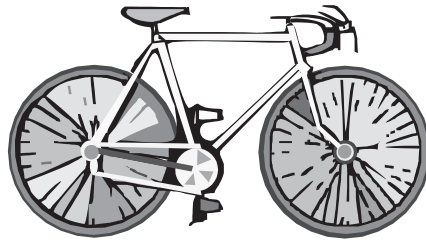
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2. Daniel wants to buy a new bicycle. It is priced at £480.



Daniel can either

- pay £480 immediately, or
- pay a 15% deposit, followed by 24 monthly payments of £22.

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

Calculate the total amount Daniel would pay using the deposit and monthly payments method. [5]

You must show all your working.

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(b) Find the percentage increase in the cost of the bicycle when Daniel pays using the deposit and monthly payments method. [3]

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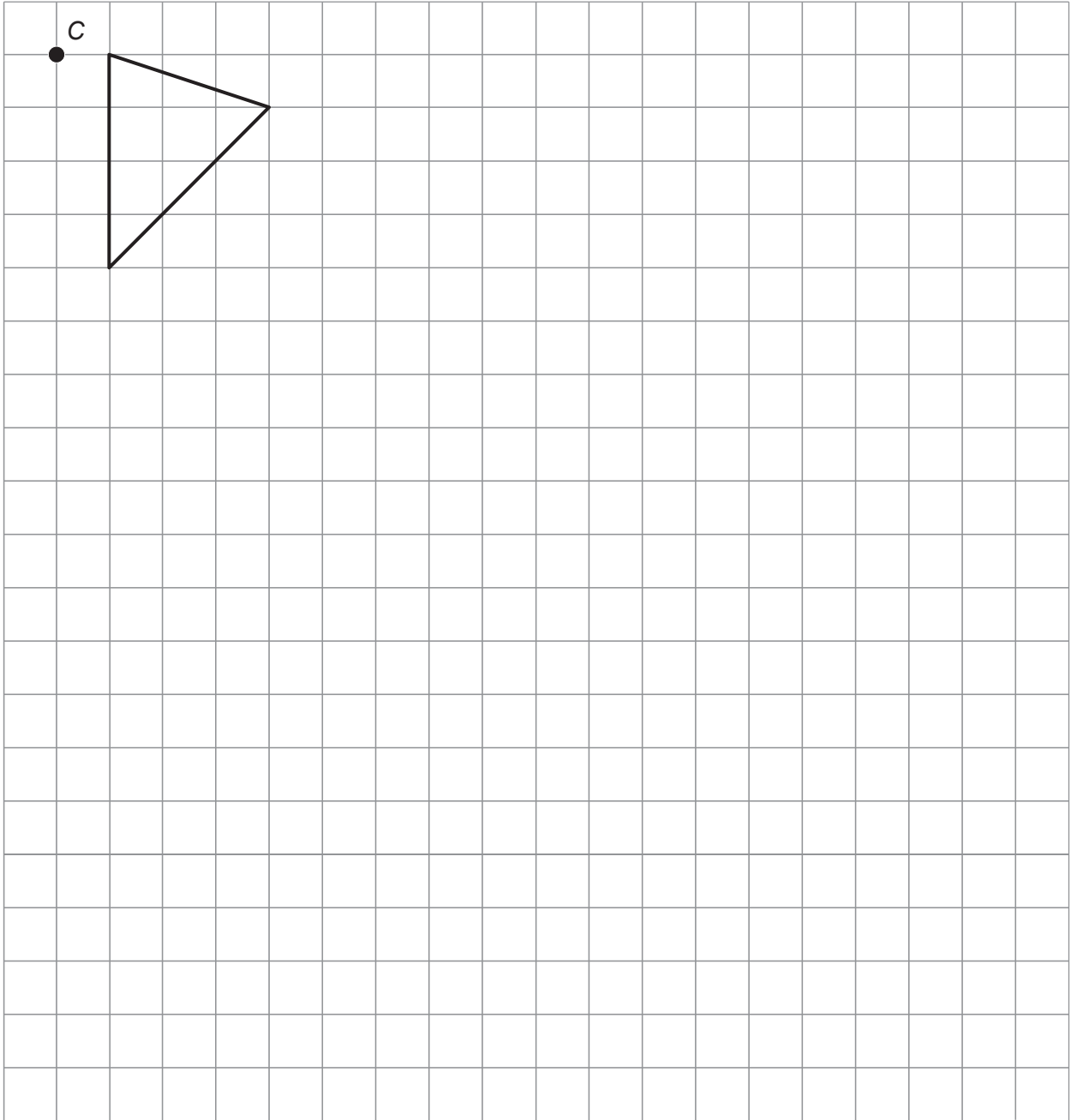
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3. Enlarge the given triangle, using scale factor 3 and centre C.

[2]



4. $ABCD$ is a parallelogram. All the angles are measured in degrees.

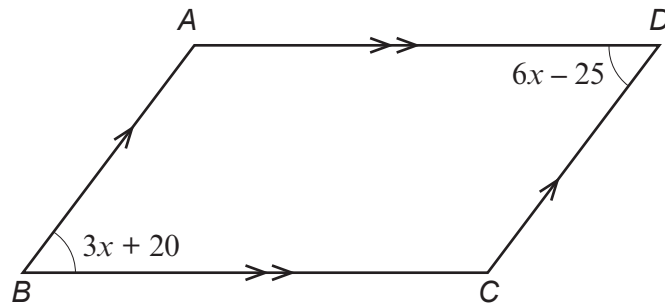


Diagram not drawn to scale

Find the size of \hat{BCD} .

[5]

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5. Express 126 as a product of prime numbers in index form.

[3]

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6. Solve the inequality $3 - x < 7$.

[2]

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7. Fracton School is organising a Summer Fayre.
Carys is making a spinner for her stall.
A sketch of her spinner is shown below.

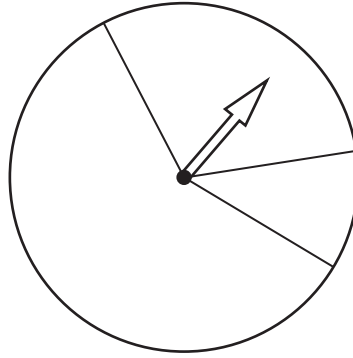


Diagram not drawn to scale

The spinner has three sectors, each to be painted a different colour: red, green or yellow.
The sectors are **not** of equal size.

- The probability that the spinner lands on the green sector is $\frac{1}{10}$.
- The probability that the spinner lands on the yellow sector is twice the probability that the spinner lands on the red sector.

Calculate the angle that the yellow sector makes at the centre of the circle.

[4]

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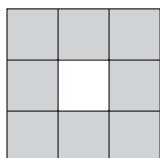
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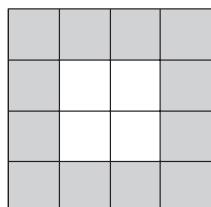


8. Grey tiles and white tiles are used to form patterns as follows.

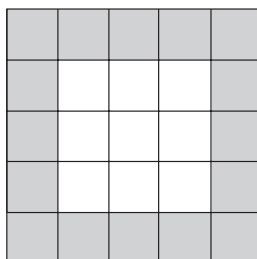
Pattern 1



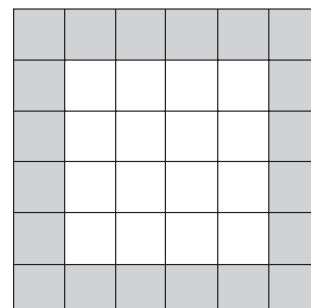
Pattern 2



Pattern 3



Pattern 4



(a) How many **grey** tiles are needed to form pattern n ? [3]

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(b) A pattern is constructed using exactly 164 **grey** tiles.
Find the number of **white** tiles used in this pattern. [3]

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9. The Evans and Smith families go to the cinema.
The Evans family buys two adult tickets and three child tickets for £31.60.
The Smith family buys one adult ticket and two child tickets for £18.60.

Find the cost of an adult ticket and the cost of a child ticket.
You must use an algebraic method.

[4]

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10. Gethin's blood contains 5.97×10^6 red blood cells per millilitre.
He has 4.02 litres of blood in his body.

Estimate the total number of red blood cells Gethin has in his blood.
Give your answer in standard form.

[3]

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11. Using the axes below, find the region defined by the following inequalities. [4]

$$\begin{aligned}x &\geq -2 \\ y &\geq 1 \\ x + 2y &\leq 4\end{aligned}$$

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

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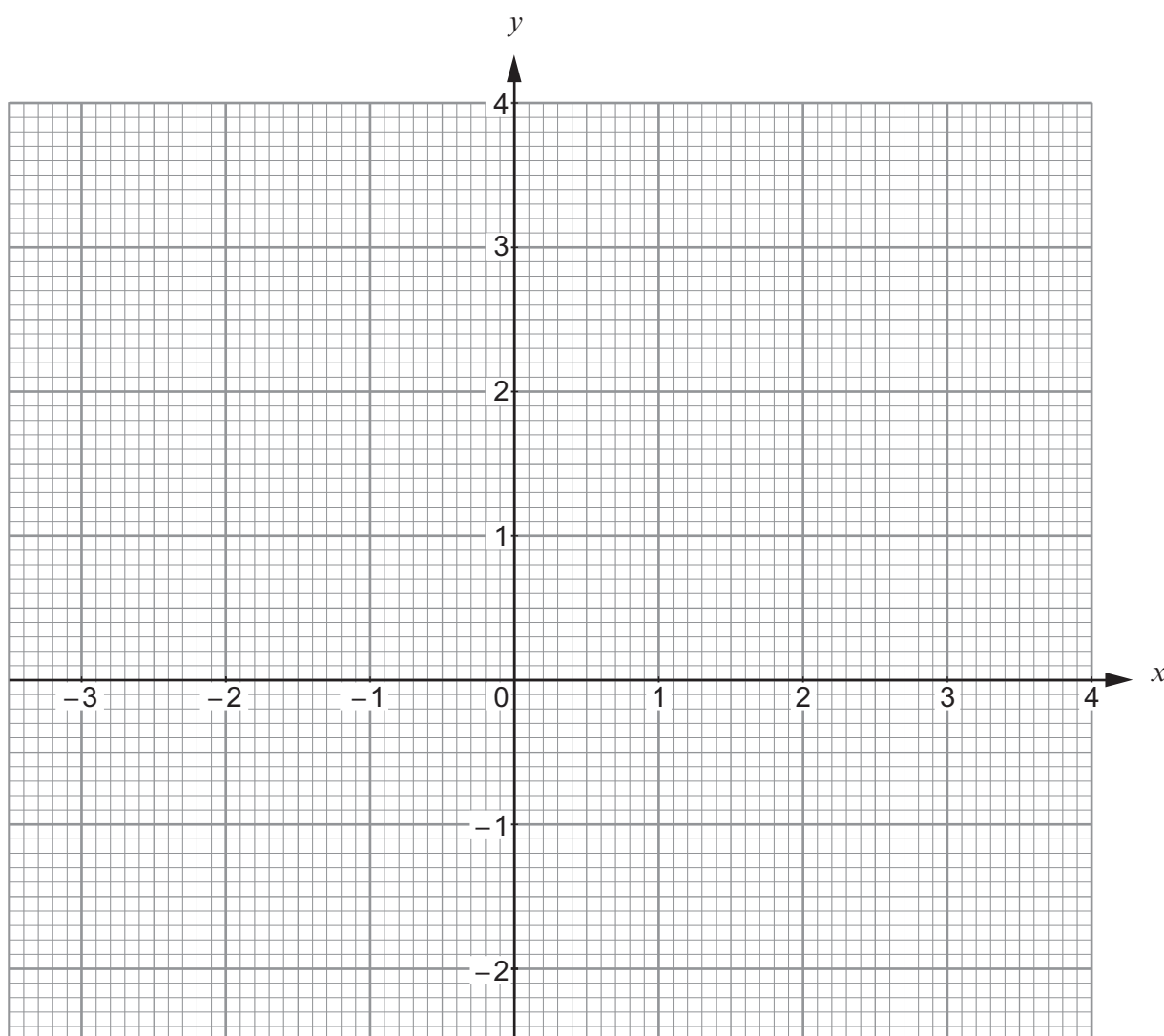
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12. (a) Expand and simplify $(c + 3)(2c - 5)$.

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(b) Make w the subject of the following formula.

[3]

$$\frac{w^2 + x^2}{4} = 1$$

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13. The points A, B, C and D lie on the circumference of a circle, centre O .
 EF is a tangent to the circle at C .
 $AB = AC$.
 $\widehat{BCE} = 38^\circ$ and $\widehat{ACD} = 41^\circ$.

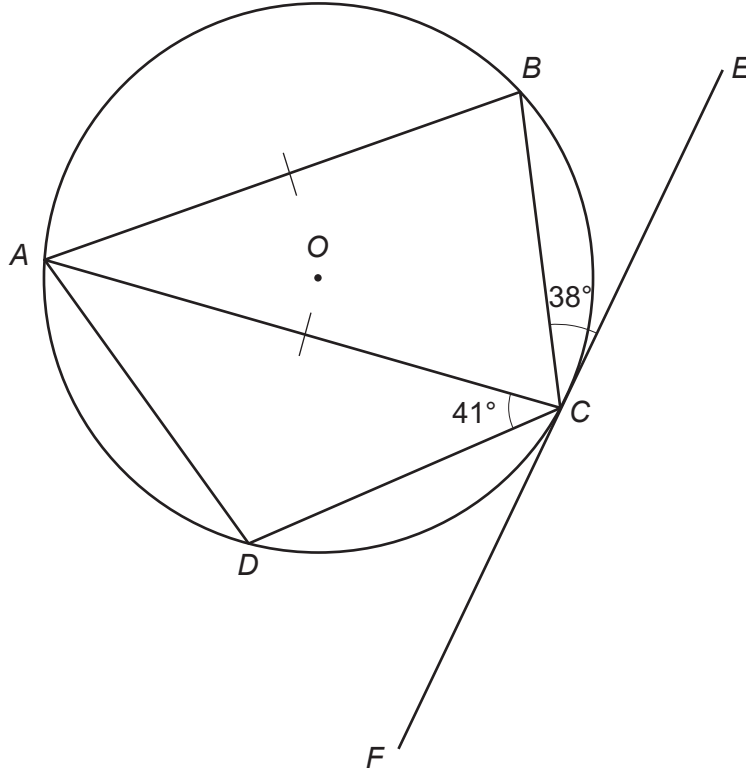


Diagram not drawn to scale

Write down the size of

(a) \widehat{BAC}

[1]

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(b) \widehat{ABC}

[1]

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(c) \widehat{ADC}

[1]

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(d) \widehat{COB}

[1]

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14. (a) Express $0.\dot{3}\dot{6}$ as a fraction.

[2]

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(b) Evaluate $\left(\frac{27}{8}\right)^{-\frac{1}{3}}$.

[2]

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(c) Simplify $\sqrt{3}(5 + \sqrt{3}) - \sqrt{3}(5 - 2\sqrt{3})$.

[2]

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15. Each of the numbers 1, 3, 5, 5, 5, 6, 7, 8 is written on a card.



Two of the eight cards are selected at random, without being replaced.

Find the probability that

(a) the product of the numbers on the two cards selected is 25, [2]

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(b) the sum of the numbers on the two cards selected is less than 15. [3]

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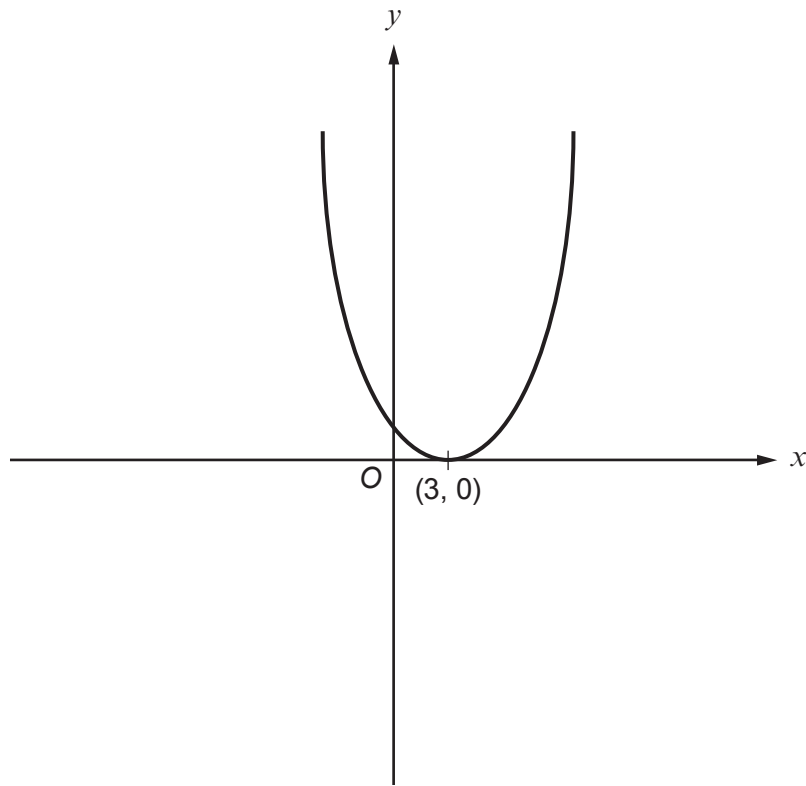
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16. The graph shows a sketch of the curve with equation $y = x^2 - 6x + 9$.
The lowest point of the curve has coordinates $(3, 0)$.



On the same axes, sketch the graph of the curve with equation $y = (x - 5)^2 - 6(x - 5) + 9$.
Indicate clearly the coordinates of the lowest point on the new curve. [2]

END OF PAPER



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