Surname	Centre Number	Candidate Number
Other Names		0

WJEC CBAC

GCSE

4352/02

W15-4352-02

MATHEMATICS (UNITISED SCHEME)

UNIT 2: Non-Calculator Mathematics

HIGHER TIER

A.M. WEDNESDAY, 14 January 2015

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 **2**.

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

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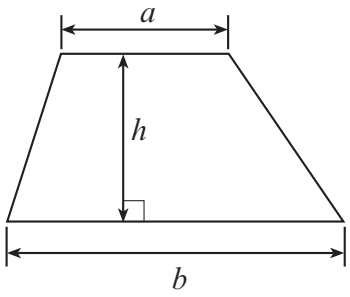
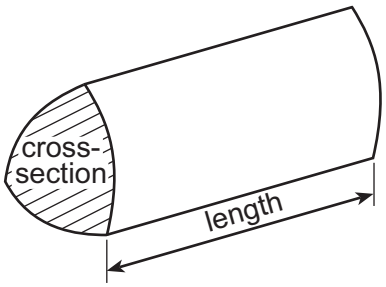
Formula List

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

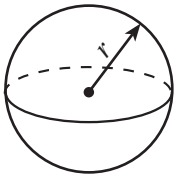


Volume of prism = area of cross-section × length



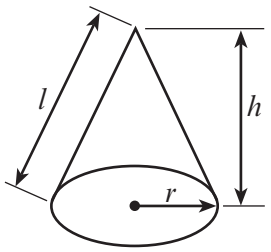
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

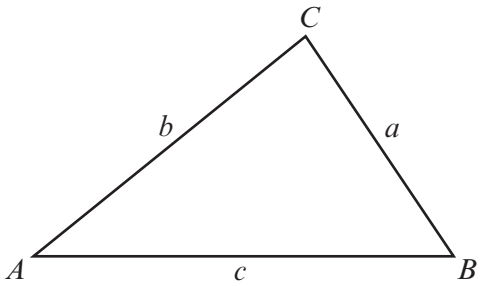


In any triangle ABC

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

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

Examiner only

1. Solve the equation $4(x + 1) = 3$. [3]

Turn over.

Examiner only

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

Adrian wanted to rent a holiday cottage in Scotland for his family.

He saw the following advertisement.

> **Rent a Scottish cottage!**
>
> £620 per week in August.
>
> Pay now and get 15% off.
>
> If you cancel, any money paid will be returned to you, less £60.

Adrian booked the cottage immediately and paid for one week in August.

The next day, Adrian saw an advertisement for a different Scottish cottage.

This cost £69 **per night** in August.

Would Adrian have saved any money if he had cancelled the booking for the first cottage and then rented the second cottage?

You must show all your working. [8]

Examiner only

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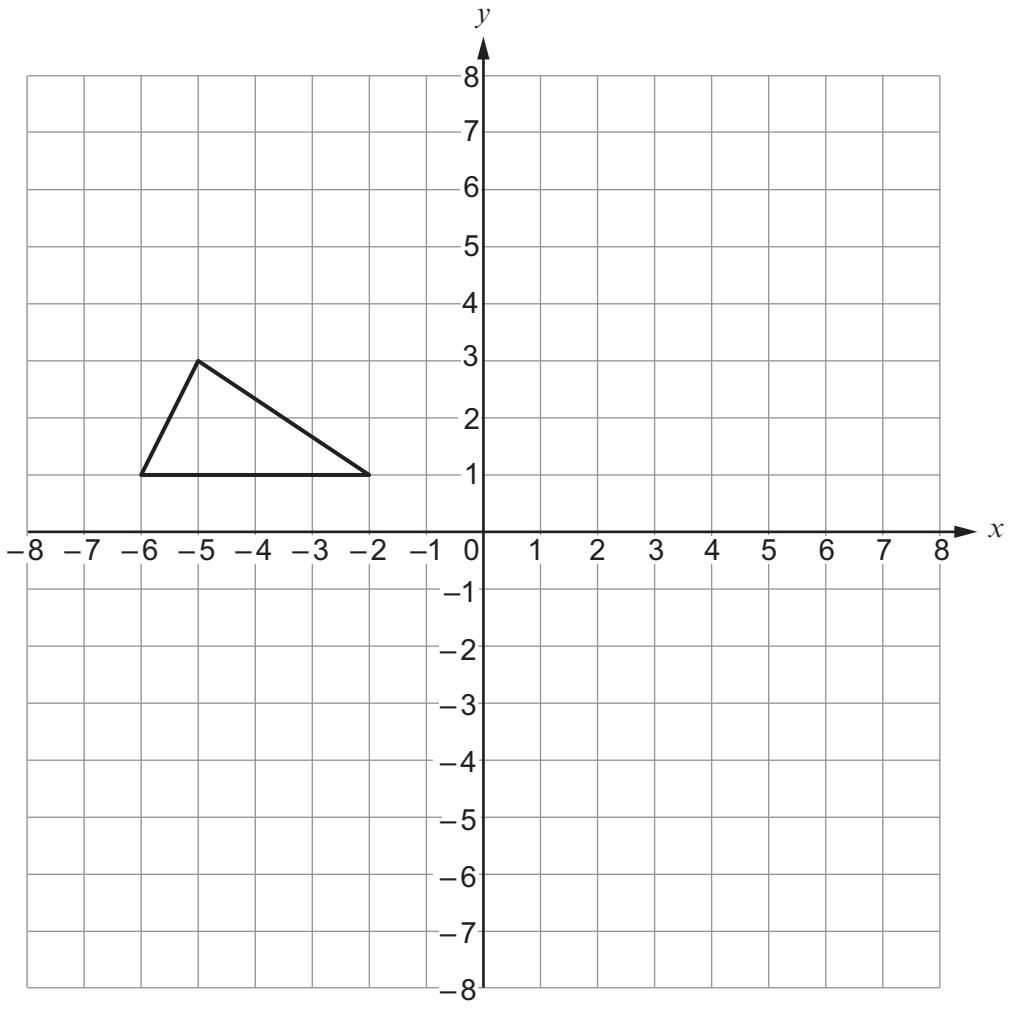
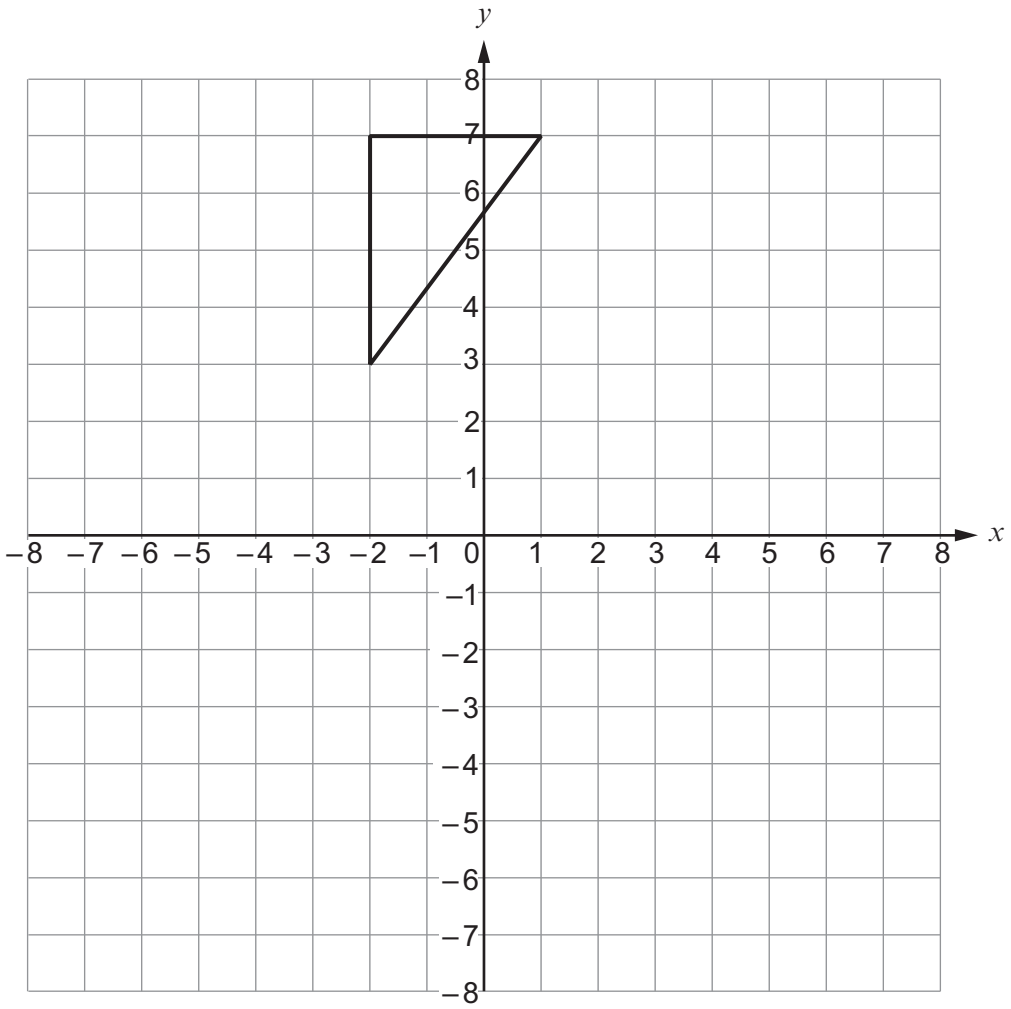
Examiner only

3. *(a)* Rotate the given triangle through 90° clockwise about the point (1, 0). [2]



Examiner only

(b) Translate the given triangle 3 units to the right and 2 units down. [1]



Examiner only

4.

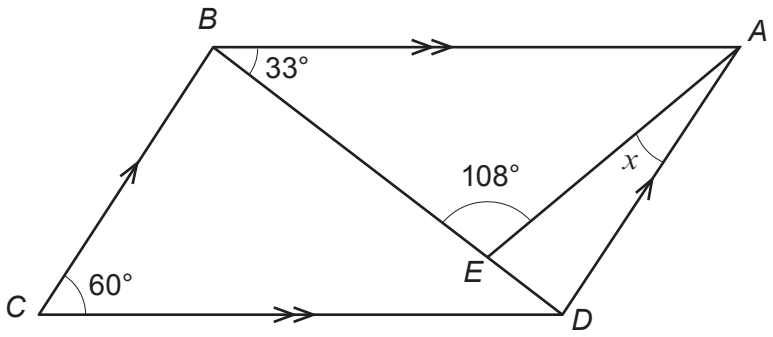


Diagram not drawn to scale

ABCD is a parallelogram.

$B\hat{C}D$ = 60°.
$A\hat{E}B$ = 108°.
$A\hat{B}E$ = 33°.

Calculate the size of angle x. [4]

Examiner only

5. *(a)* Simplify $4(2x + 3) - 3(x + 2)$. [2]

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(b) Write down an expression for the nth term of the following sequence. [2]

3, 13, 23, 33, 43, ...

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nth term .....

(c) Solve the following inequality. [2]

$4x + 7 > 9$

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Turn over.

Examiner only

6. Alan is a professional darts player. He claims that, with any throw, he can hit the bull's-eye (in the centre of the board) with a probability of 50%.

Ffion challenges him to prove this by throwing 5 sets of 10 darts.

Alan's results are given in the following table.

Number of throws	10	10	10	10	10
Number of throws hitting the bull's-eye	4	8	3	3	2

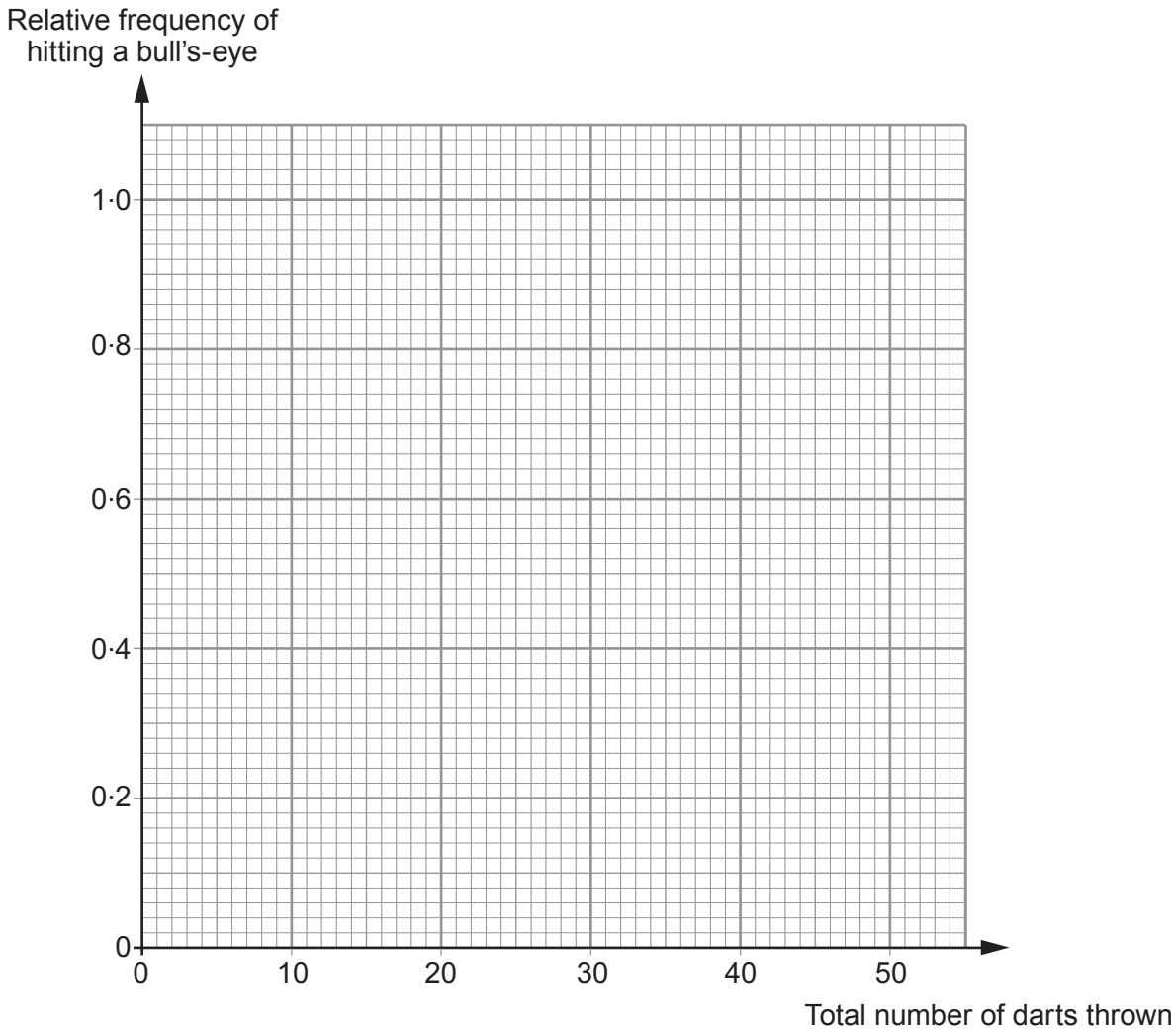
Ffion then creates a table to show the cumulative number of bull's-eyes and to calculate the relative frequencies.

Total number of throws	10	20	30	40	50
Total number of throws hitting the bull's-eye	4	12			
Relative frequency of hitting a bull's-eye	$\frac{4}{10}$	$\frac{12}{20}$			
	0·4	0·6			

(a) Complete the table above. [3]

Examiner only

(b) Draw a graph to show the relative frequency of hitting a bull's-eye. [2]



(c) Is Alan correct to claim that he has a probability of 50% of hitting the bull's-eye? Explain your answer. [1]

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Examiner only

7. When she was in Year 7, Yasmin could run 800 metres in 3 minutes and 20 seconds.

Four years later, when she was in Year 11, she could run 800 metres in 2 minutes and 48 seconds.

Find the percentage improvement in her time. [3]

Examiner only

8. Write the following numbers in standard form.

(a) 0·000097 [1]

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(b) 4 780 000 000 [1]

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Examiner only

9. Two different straight lines have the equations

$$y = 4x + 3 \quad \text{and} \quad 2y - 8x = 10.$$

Are these lines parallel? You must explain your answer. [2]

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Examiner only

10. The Davies family want to buy some garden furniture. Their local garden centre stocks the particular brand they would like.

The price of one garden bench and four chairs is £310.
The price of two garden benches and three chairs is £345.

The Davies family have £450 available to spend.

Do they have enough money to buy two garden benches and five chairs?

You must show all your working. [5]

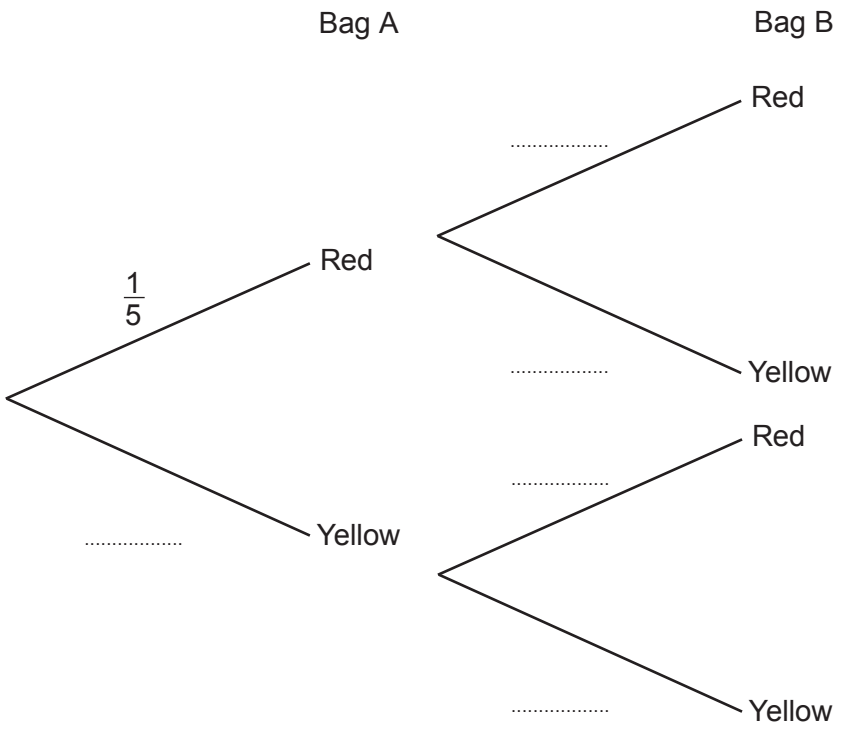
Examiner only

11. A game involves two bags, each containing coloured balls.

Bag A contains 1 red ball and 4 yellow balls.
Bag B contains 2 red balls and 1 yellow ball.

A player picks one ball at random from each bag.

(a) Complete the following tree diagram. [2]



(b) Find the probability of picking one ball of each colour. [3]

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Examiner only

12. Rearrange the following formula to make h the subject. [4]

$$\frac{5h + 3k}{h + 4} = 2$$

Examiner only

13. *(a)* The points *A*, *B* and *C* lie on the circumference of a circle, centre *O*.

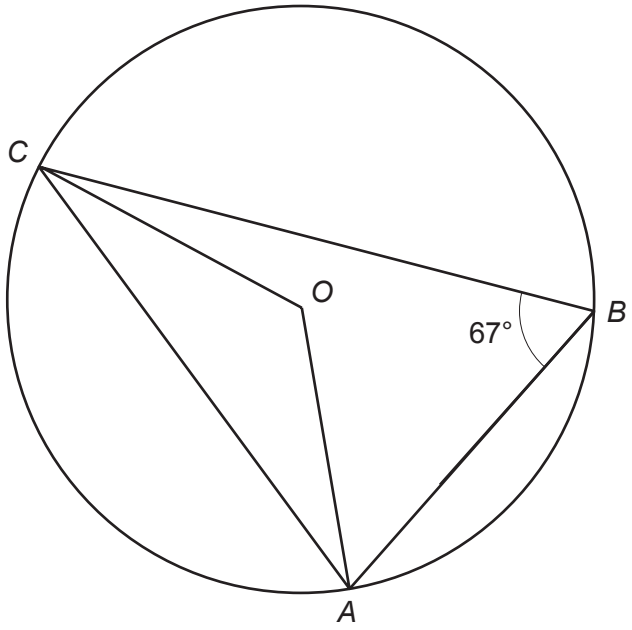

Diagram not drawn to scale

Find the size of $O\hat{A}C$. [3]

Examiner only

(b) The points *D*, *E* and *F* lie on the circumference of another circle. *GH* is a tangent to the circle at *F.*

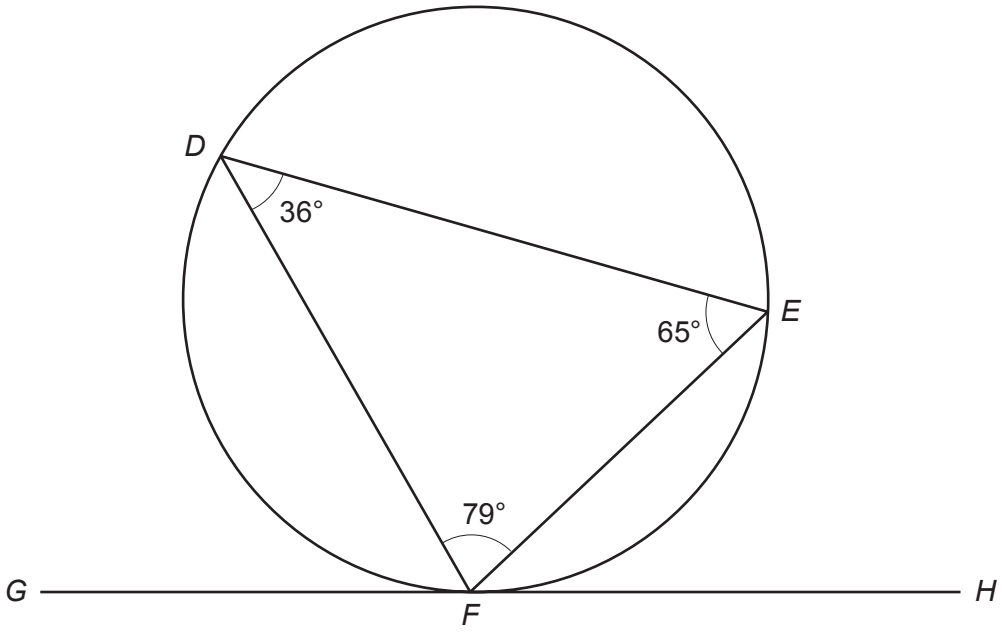

Diagram not drawn to scale

Write down the size of $E\hat{F}H$, giving a reason for your answer. [2]

$E\hat{F}H$ = ... °

Reason: .....

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Examiner only

14. *(a)* Express $0\cdot2\dot{7}\dot{4}$ as a fraction. [2]

(b) Evaluate

(i) $7\cdot3^0$ [1]

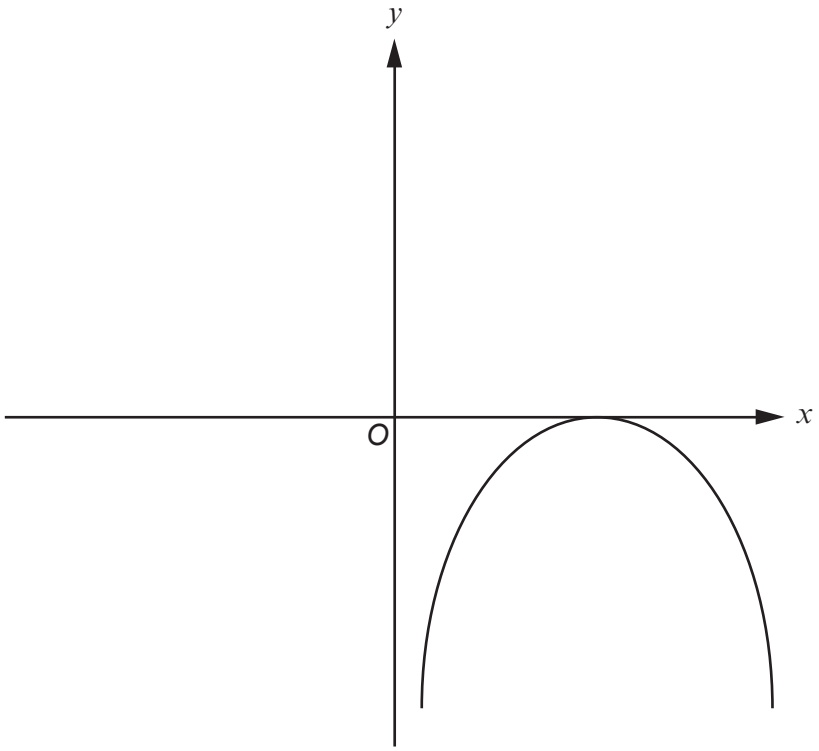
(ii) $27^{-\frac{2}{3}}$ [2]

Examiner only

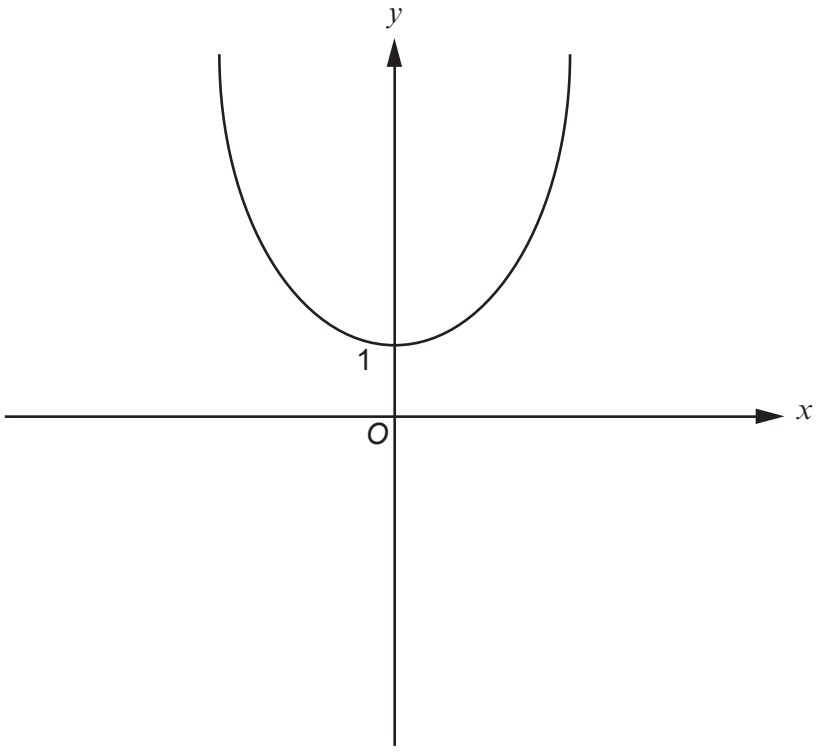
(c) Simplify $\left(5 - 3\sqrt{2}\right)\left(5 + 3\sqrt{2}\right)$. [2]

Examiner only

15. *(a)* This diagram shows a sketch of the curve $y = f(x)$.
On the same diagram, sketch the curve $y = -f(x)$. [1]



(b) This diagram shows a sketch of the curve $y = g(x)$.
On the same diagram, sketch the curve $y = g(2x)$. [1]



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