

Surname	Centre Number	Candidate Number
First name(s)		0



**GCSE**

3300U50-1



**THURSDAY, 16 MAY 2024 – MORNING**

**MATHEMATICS  
UNIT 1: NON-CALCULATOR  
HIGHER TIER**

1 hour 45 minutes

**ADDITIONAL MATERIALS**

The use of a calculator is not permitted in this examination.  
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.

You may use a pencil for graphs and diagrams only.

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 additional page at the back of the booklet. Question numbers must be given for all work written on the additional page.

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.

In question 2, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	6	
2.	6	
3.	3	
4.	5	
5.	5	
6.	4	
7.	3	
8.	3	
9.	5	
10.	3	
11.	3	
12.	6	
13.	5	
14.	2	
15.	3	
16.	9	
17.	4	
18.	5	
<b>Total</b>	<b>80</b>	

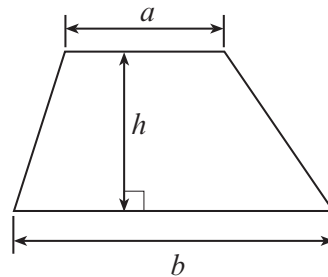
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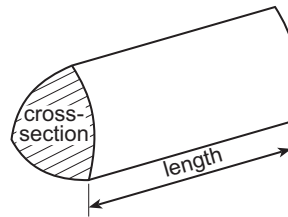
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### Formula List – Higher Tier

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

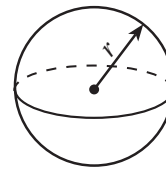


**Volume of prism** = area of cross-section  $\times$  length



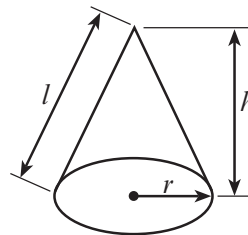
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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



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

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

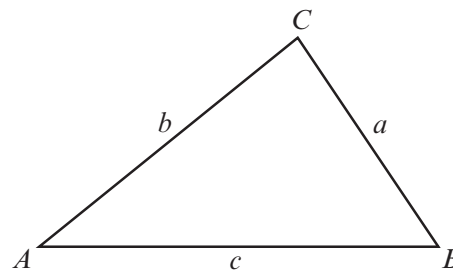


In any triangle  $ABC$

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

### Annual Equivalent Rate (AER)

AER, as a decimal, is calculated using the formula  $\left(1 + \frac{i}{n}\right)^n - 1$ , where  $i$  is the nominal interest rate per annum as a decimal and  $n$  is the number of compounding periods per annum.



1. (a) Write the reciprocal of 4 as a decimal. [1]

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- (b) Estimate the value of  $\frac{79.34}{40.1 \times 0.48}$ .

You must show all your approximations in your working. [2]

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- (c) Evaluate

$$1\frac{5}{7} + 2\frac{11}{14}.$$

Give your answer in its simplest form. [3]

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3. Point  $P$  lies on:
- the bisector of angle  $ABC$
  - the perpendicular bisector of line  $BC$ .

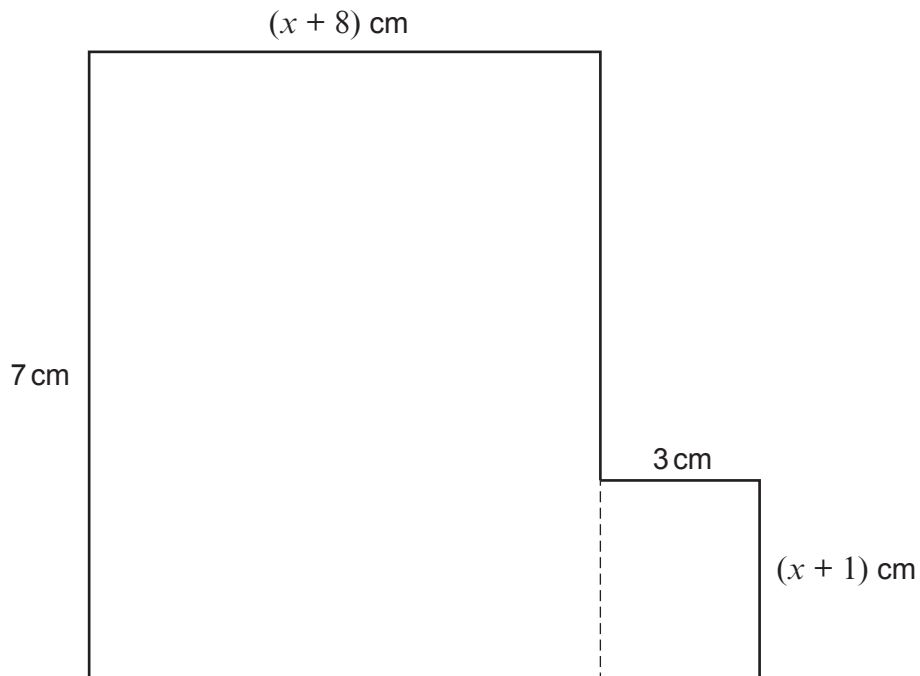
Using only a ruler and a pair of compasses, **construct** suitable lines and arcs to show the position of point  $P$ .

Construction arcs must be clearly shown.

[3]



4. The diagram below shows a shape made by joining two rectangles together. The area of the whole shape is  $89 \text{ cm}^2$ .



*Diagram not drawn to scale*

Form and solve an equation to find the value of  $x$ .

[5]

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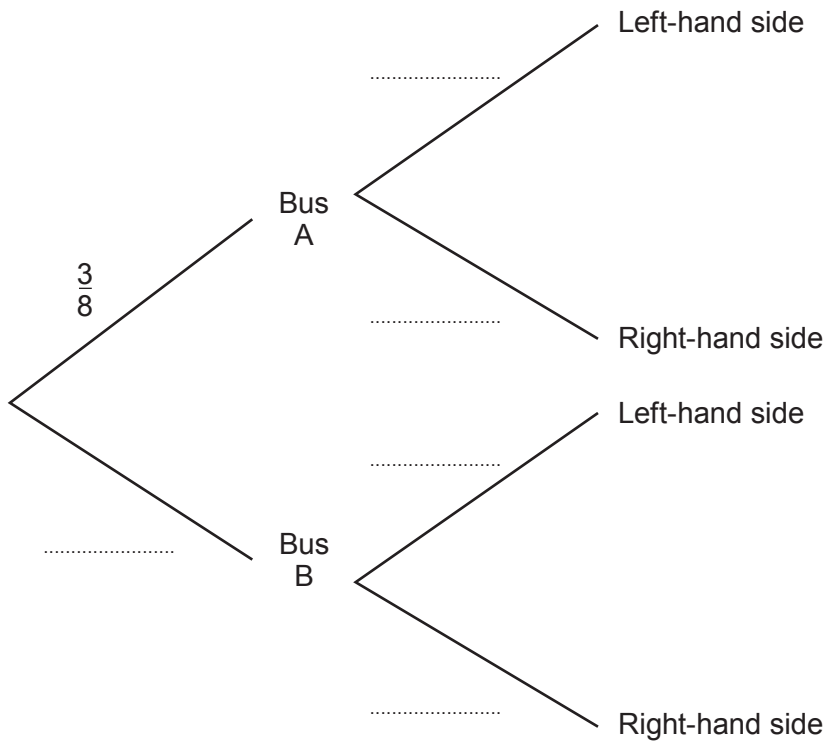


6. A group of people hired two buses, Bus A and Bus B, to take them home from a party.  
 Bus A left the party at 11:00 p.m.  
 Bus B left the party at midnight.

A person from the group is chosen at random.  
 The probability that this person left the party on Bus A is  $\frac{3}{8}$ .

The probability that this person sat on the left-hand side of the bus is equal to the probability that this person sat on the right-hand side.

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



- (b) What is the probability that this person sat on the right-hand side of the bus that left at midnight? [2]

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7. (a) Express 0.0057 in standard form.

[1]

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(b) Calculate the value of  $\frac{2 \times 10^4}{5 \times 10^{-3}}$ .

Give your answer in standard form.

[2]

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8. A car travels a distance of  $x$  miles in 2 hours.  
In the next hour, it travels a further distance of 36 miles.

Its average speed for the whole journey is 42 mph.

Calculate the value of  $x$ .

You must show all your working.

[3]

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14. Factorise  $2x^2 - 17x + 30$ .

[2]

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15. (a) Circle the correct answer in each of the following questions:

(i)  $\sqrt{20}$  is equal to

[1]

$5\sqrt{2}$

$2\sqrt{5}$

10

$5\sqrt{4}$

$4\sqrt{5}$

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(ii)  $\sqrt{2} + \sqrt{50}$  is equal to

[1]

$\sqrt{52}$

10

$6\sqrt{2}$

26

$26\sqrt{2}$

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(b) When  $q = \sqrt{18}$ , which **one** of the following produces a rational number?  
Circle your answer.

[1]

$\sqrt{q}$

$\frac{q}{2}$

$q - 2$

$q^4$

$18q$

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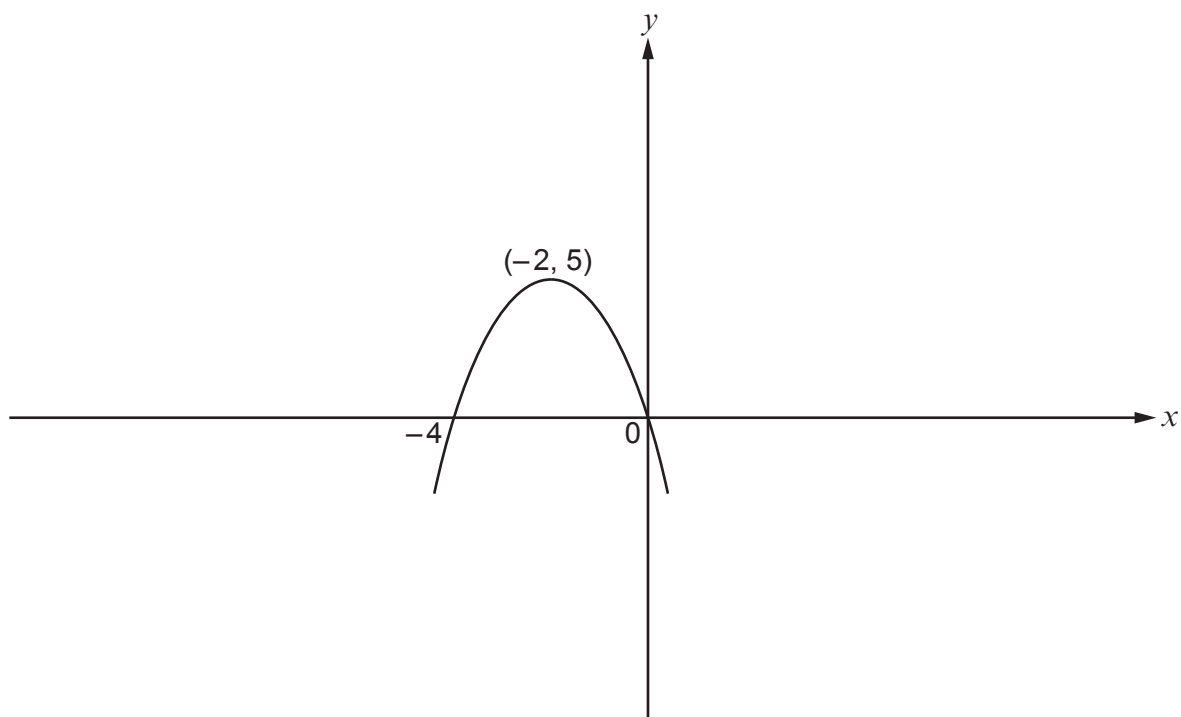




18. (a) The highest point of a curve is called a maximum point.  
The diagram below shows a sketch of the curve with equation  $y = f(x)$ .  
The maximum point of this curve has coordinates  $(-2, 5)$ .

- (i) On the same diagram, sketch the curve  $y = f(x - 6)$ .  
Mark clearly the coordinates of any point where the new curve crosses an axis.

[2]



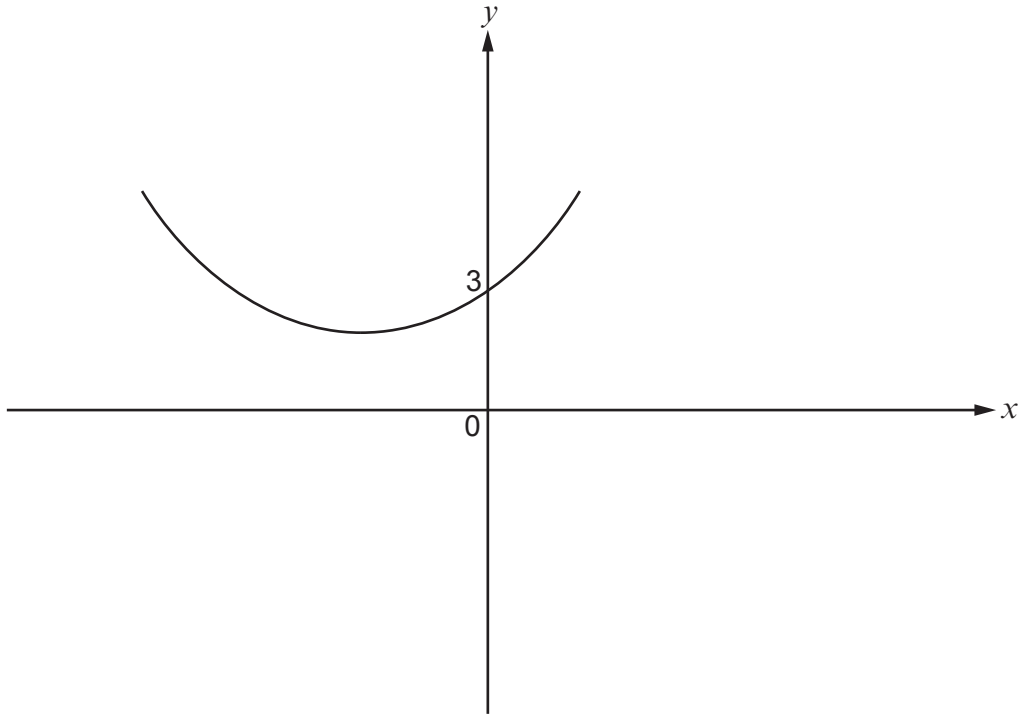
- (ii) Complete the following sentence.

The maximum point of the curve  $y = f(x - 6)$  has coordinates .....

[1]



- (b) The diagram shows a sketch of  $y = g(x)$ .  
On the same diagram, sketch the curve  $y = -g(x)$ .  
Mark clearly the coordinates of any point where the new curve crosses an axis. [2]



**END OF PAPER**



