Surname	Centre Number	Candidate Number
First name(s)		0

Examiner only

REVISE .wales

GCSE

R.WM-MNH-U2-002

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MOCK PAPER B

MATHEMATICS AND NUMERACY (DOUBLE AWARD)

UNIT 2: NON-CALCULATOR
HIGHER TIER

1 hour 45 minutes

ADDITIONAL MATERIALS

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

A ruler, 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 π as $3{\cdot}14$.

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 **5**, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

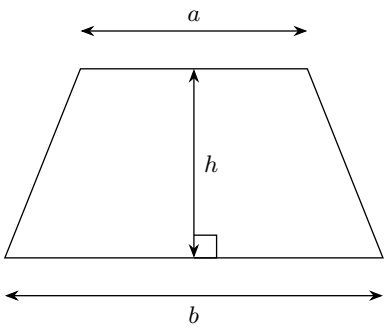
For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**5**	
2.	**7**	
3.	**8**	
4.	**9**	
5.	**10**	
6.	**11**	
7.	**11**	
8.	**8**	
9.	**11**	
Total	**80**	

RWMMNHU2 02

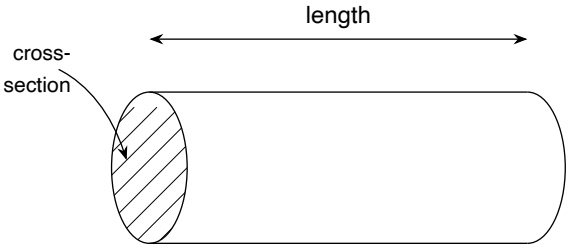
MOCK-2026-002-U2

Formula List – HIGHER TIER

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

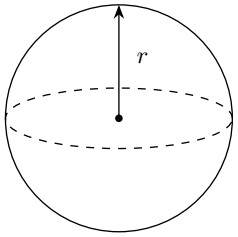


Volume of prism = area of cross-section $\times$ length



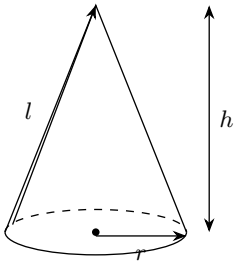
Volume of sphere $= \frac{4}{3}\pi r^3$

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



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

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

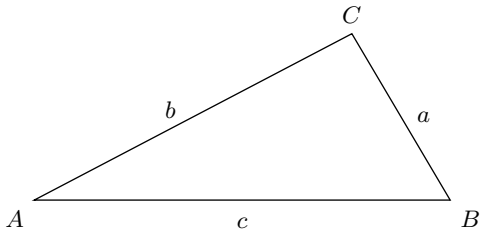


In any triangle ABC

Sine rule $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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 $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

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. Two whole numbers are written as products of their prime factors:

$$P = 2^3 \times 3 \times 5^2, \qquad Q = 2^2 \times 3^3 \times 5.$$

(a) Write down, as products of prime factors, the lowest common multiple (LCM) and the highest common factor (HCF) of P and Q. You do not need to evaluate them. [2]

LCM = ...

HCF = ...

(b) Simplify, leaving your answers in index form with a single base.

(i) $\dfrac{7^5 \times 7^{-2}}{7^0}$ [1]

(ii) $\left(a^{-2}\right)^3 \times a^9$ [1]

(c) Write $\sqrt{2{\cdot}5 \times 10^{-5}}$ in the form $a \times 10^n$, where $1 \leq a < 10$ and n is an integer. [1]

Answer = ...

2.

(a) Simplify fully $\sqrt{27} + 2\sqrt{12} - \sqrt{75}$, giving your answer in the form $k\sqrt{3}$ where k is an integer. [2]

Answer = ...

(b) Rationalise the denominator of $\dfrac{3+\sqrt{5}}{2-\sqrt{5}}$, giving your answer in the form $a + b\sqrt{5}$ where a and b are integers. [2]

Answer = ...

(c) **Show that** $0 \cdot 1\dot{4}\dot{5} = \frac{8}{55}$. (The digits 45 recur; the leading 1 does not.) [3]

3. The table below shows four algebraic expressions handled by a spreadsheet. Three of the cells have been left blank.

Operation	**Input**	**Simplified output**
Expand & simplify	$(x+3)(x-2)(x+1)$	?
Factorise fully	$9x^2 - 16y^2$	$(3x-4y)(3x+4y)$
Simplify	$\dfrac{3x^2+7x+2}{x^2-4}$	?
Combine as one fraction	$\dfrac{2}{x+1} + \dfrac{3}{x-2}$	?

(a) Expand and simplify $(x+3)(x-2)(x+1)$. [2]

Answer = ...

(b) Factorise fully $9x^2 - 16y^2$. [2]

Answer = ...

(c) Simplify $\frac{3x^2 + 7x + 2}{x^2 - 4}$ fully. [2]

Answer = ...

(d) Write $\frac{2}{x+1} + \frac{3}{x-2}$ as a single fraction in its simplest form. [2]

Answer = ...

4.

(a) Solve the equation [3]

$$\frac{2x-1}{5}+\frac{x+3}{2}=4.$$

$x =$ .....

(b) Solve the simultaneous equations [3]

$$3x+2y=7, \qquad 5x-2y=17.$$

. . . . . .

. . . . . .

$x =$ . . . . . .

$y =$ . . . . . .

(c) The volume V of a hemisphere of radius r is given by [3]

$$V = \frac{2}{3}\pi r^3.$$

Rearrange the formula to make r the subject, giving your answer in its simplest form.

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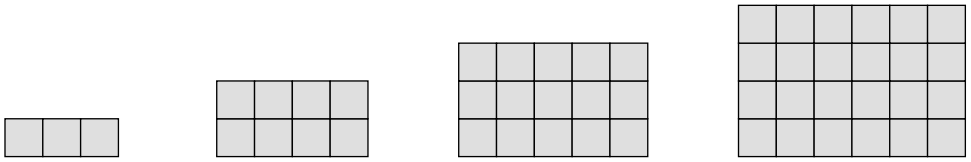
$r =$ . . . . . .

5. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

A pattern of grey tiles is built up as shown below. The number of tiles in successive patterns forms the sequence

$$3,\ 8,\ 15,\ 24,\ 35,\ \ldots$$



Pattern 1 — 3 tiles

Pattern 2 — 8 tiles

Pattern 3 — 15 tiles

Pattern 4 — 24 tiles

(a) Find an expression, in terms of n, for the number of tiles in Pattern n. Hence calculate the number of tiles in Pattern 20. [4]

Pattern n has: .....

Pattern 20 has: .....

(b) [4 + 2 OCW]

A student claims that 250 is a term in the sequence above. By comparing 250 with appropriate consecutive terms, decide whether the student is correct. Justify your answer with clear working.

Conclusion: .....

6.

(a) Solve $2x^2 + 5x - 3 = 0$ by factorisation. [2]

$x =$ ..... or $x =$ .....

(b) The quadratic expression $x^2 - 6x + 2$ can be written in the completed-square form $(x - p)^2 + q$, where p and q are integers. [4]

(i) Find the values of p and q.

(ii) Hence write down the coordinates of the turning point of the curve $y = x^2 - 6x + 2$, and state whether it is a maximum or minimum.

.....

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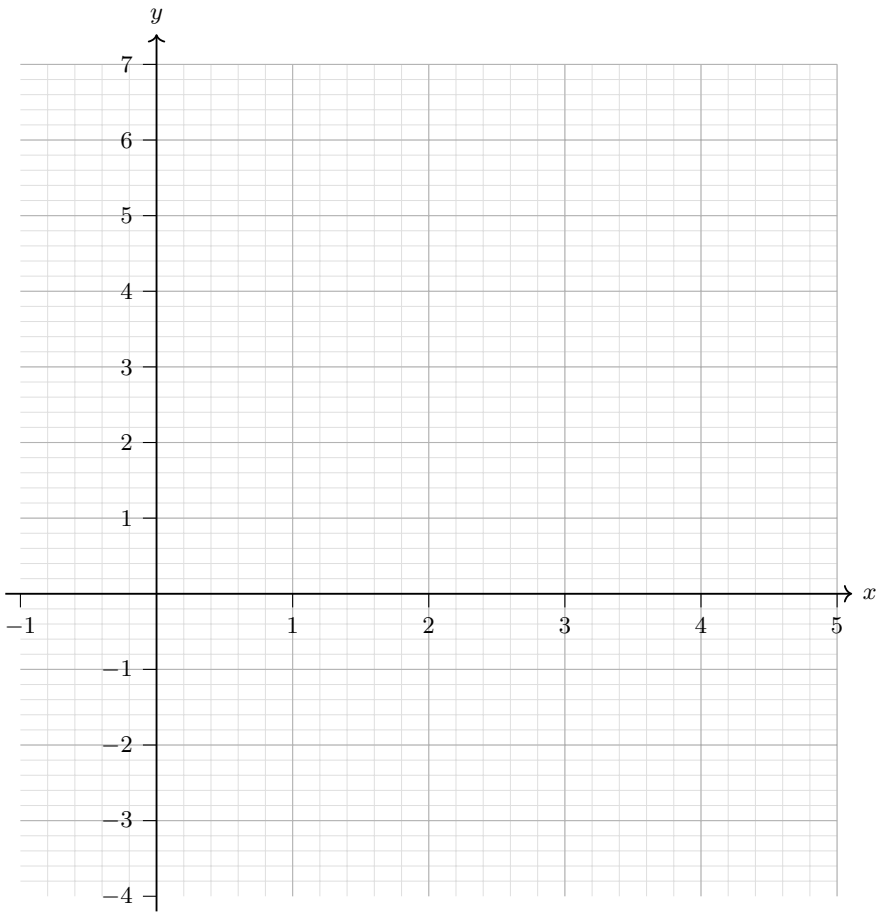
.....

$p =$, $q =$ .....

Turning point: .....

(c) Complete the table of values for $y = x^2 - 4x + 1$, then draw its graph on the grid provided for $-1 \leq x \leq 5$. By drawing a suitable straight line on the same grid, use your graph to solve the equation $x^2 - 4x + 3 = 0$. [5]

x	-1	0	1	2	3	4	5
y	6	1	?	?	-2	1	?

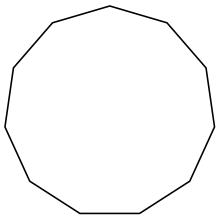


Line drawn: $y =$ .....

Solutions of $x^2 - 4x + 3 = 0$: .....

7.

(a) The interior angles of a regular polygon sum to $1620°$. How many sides does the polygon have? [2]



regular polygon (sketch)

Diagram not drawn to scale

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Number of sides = ...

In the diagram below, PT and PS are tangents to a circle with centre O, drawn from the external point P. The angle $\angle TPS = 50°$.

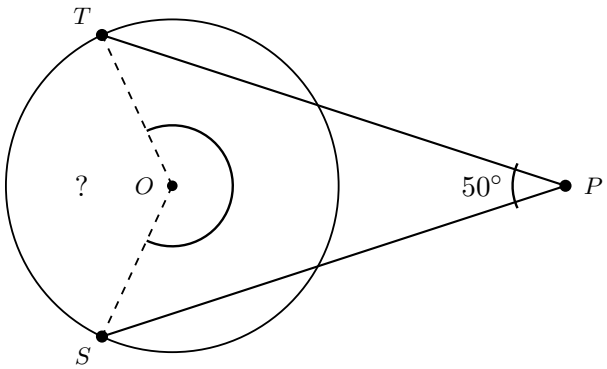


Diagram not drawn to scale

(b) Find the size of angle TOS, giving full reasons for your answer. [3]

Angle $TOS =$ .....

In the diagram below, A, B, C and D are points on the circumference of a circle. PT is the tangent to the circle at B, and $\angle TBC = 38°$, $\angle BAD = 78°$.

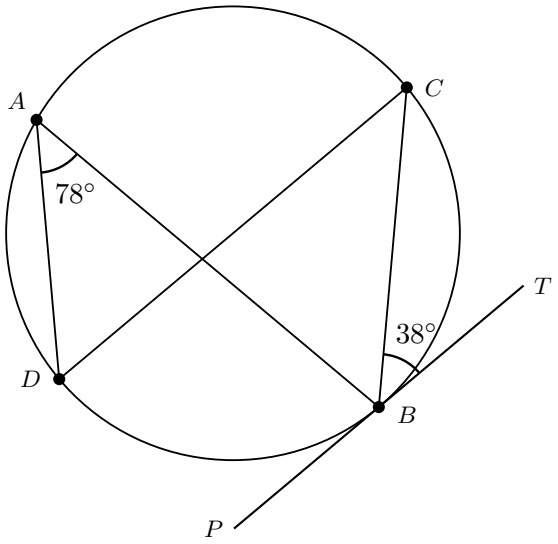


Diagram not drawn to scale

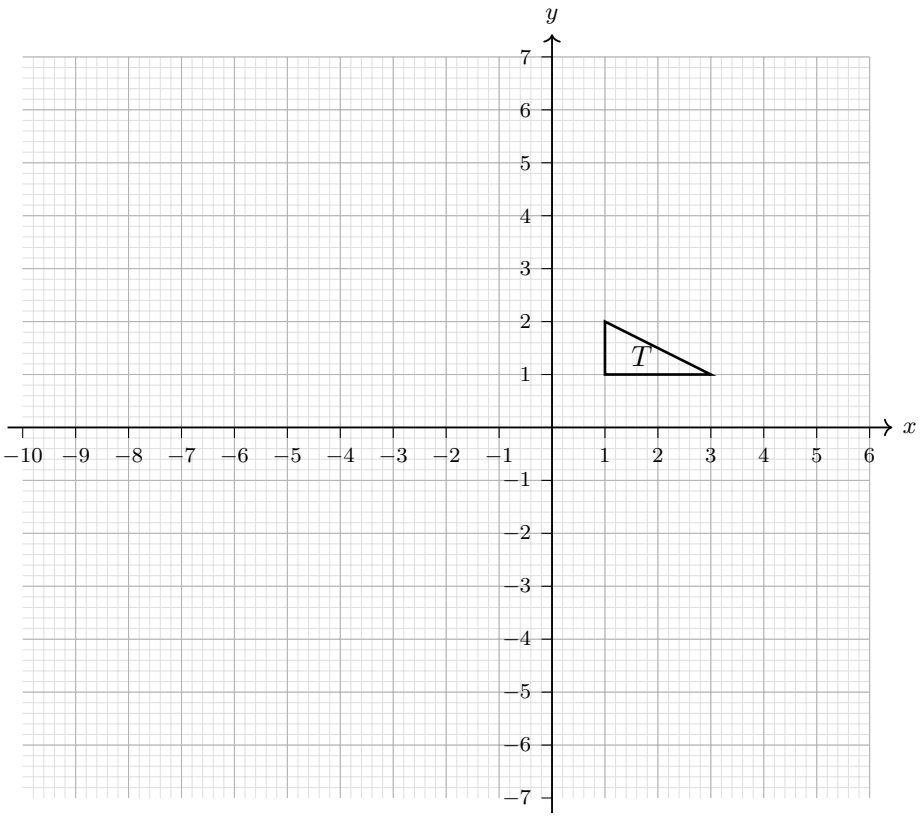
(c) Find the size of angle BDC, giving a reason for your answer. [3]

Angle $BDC =$ .....

(d) Find the size of angle BCD, giving full reasons. [3]

Angle $BCD =$ .....

8. Triangle T is drawn on the coordinate grid below, with vertices at $(1, 1)$, $(3, 1)$ and $(1, 2)$.

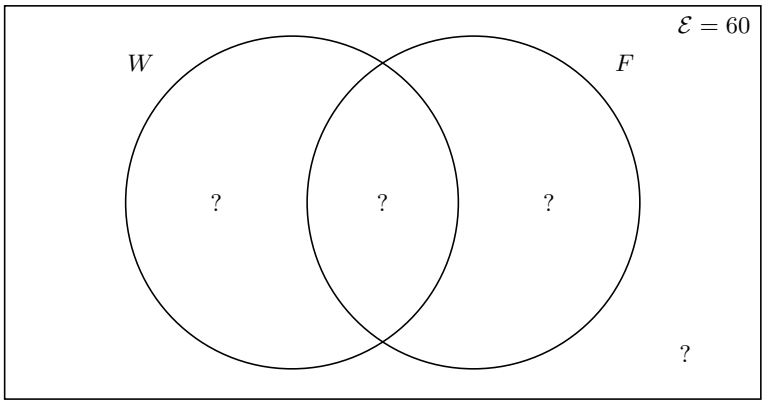


(a) On the grid above, draw the image of triangle T after a reflection in the line $y = x + 1$. [2]
Label the image A.

(b) On the same grid, draw the image of triangle T after a rotation of $180°$ about the point $(2, 0)$. Label the image B. [3]

(c) Triangle C has vertices at $(-3, -3)$, $(-9, -3)$ and $(-3, -6)$. Triangle T can be mapped onto triangle C by a *single* transformation. Describe this transformation fully. [3]

9. A school surveyed 60 Year 11 students. Of these, 35 study Welsh (W), 28 study French (F) and 8 study *neither* language.

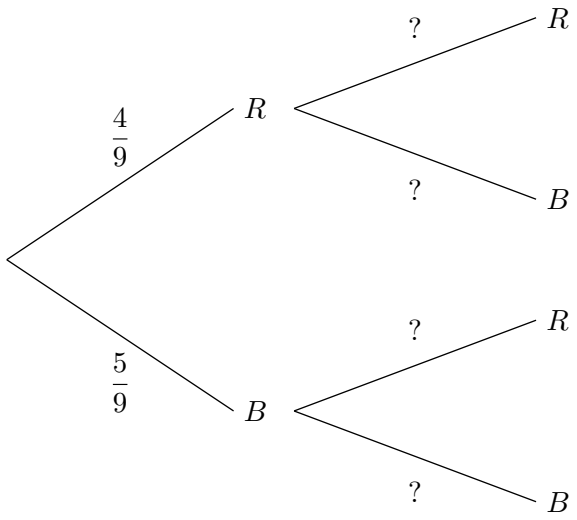


(a) Complete the Venn diagram above. A student is chosen at random from those who study *at least one* of the two languages. Find the probability that this student studies *both* languages. Give your answer as a fraction in its simplest form. [3]

Probability = ...

A bag contains 4 red counters and 5 blue counters. Two counters are drawn at random, *without replacement*.

(b) Complete the tree diagram below and use it to find the probability that the two counters drawn are of the *same* colour. Give your answer as a fraction in its simplest form. [4]



Probability = ...

(c) A second bag contains n blue counters and 3 yellow counters. Two counters are drawn at random without replacement. The probability that *at least one* of the two counters is yellow is $\frac{9}{14}$. [4]

Show that $3n^2 - 13n - 10 = 0$, and hence find the value of n. You must justify any decision you make.

$n =$ .....