



Annual Examinations for Secondary Schools 2022

YEAR 9

MATHEMATICS

MARKING SCHEME

Notes for Marking of Scripts

Types of Marks

Method marks are awarded for knowing a correct method of solution and attempting to apply it. Method marks cannot be lost for arithmetic mistakes. They can only be awarded if the method used would have led to the correct answer had not an arithmetic mistake been made. Unless otherwise stated, any valid method not specified in the marking scheme is to be accepted and marked accordingly.

There are two types of Method marks, **M** marks and **(M)** marks.

- **M marks**, are only awarded if method is seen.
- **(M) marks** are awarded even when a correct answer is given and no work is shown.

There are two types of Accuracy marks, **A** marks and **B** marks.

- **A** marks are accuracy marks given for correct answer only (c.a.o.).
 - * Incorrect answers, even though nearly correct, score no marks.
 - * Accuracy marks are also awarded for incorrect answers which are correctly followed through (f.t.) from an incorrect previous answer, **provided that f.t. is indicated in the marking scheme.**
 - * No Method marks **M/(M)** or Accuracy marks **A**, are awarded when a wrong method leads to a correct answer.
 - * When a question is assigned **M** and **A** marks and students present a correct answer without any working, only **A** marks are awarded.
- **B** marks are accuracy marks awarded for specific results or statements independent of the method used.

Misreading

Method marks can still be earned (unless that part of the question is trivialised) but the final Accuracy marks are lost.

Crossed out working

An answer or working that is crossed out and not replaced is marked as if it were not crossed out. If the answer or working is replaced, then the crossed out answer or working is ignored and should not be considered for marking.

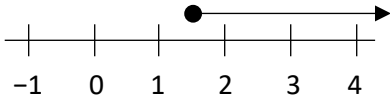
Units

In general, missing or inaccurate units are not penalised unless otherwise indicated in the marking scheme.

Other

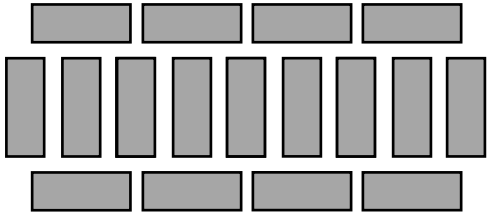
- Incorrect working or statement following a correct answer is ignored.
- Marks are not sub-divisible; no half marks may be awarded.
- Other abbreviations used:
 - * o.e. (or equivalent)
 - * e.e.o.o. (each error or omission)
- Markers are advised to indicate the **M**, **(M)**, **A** or **B** marks awarded in the body of the script and then write their total in the margin. The total mark for each question should be written in the table included at the top of page 1 of the main paper. This measure facilitates the moderation of papers.

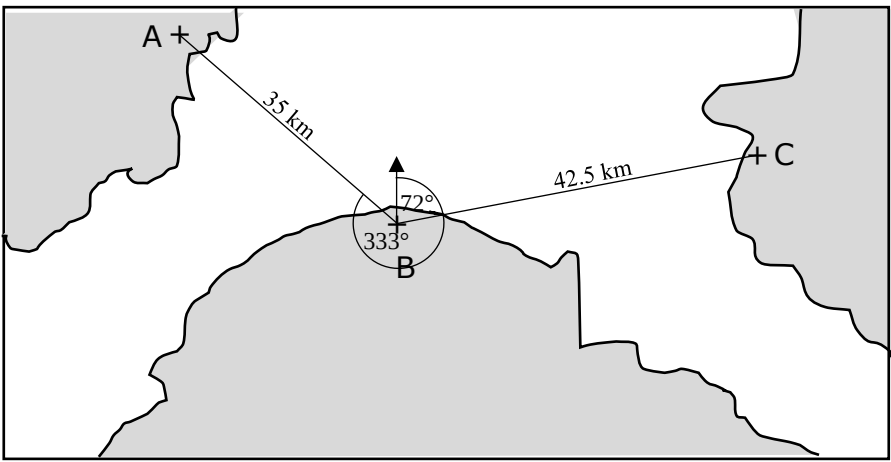
NON CALCULATOR PAPER (25 marks)

Ques.		Requirements	Mark		Additional Guidance
1.	a)	$4280 - 290$ 3990	M1 A1	4	
	b)	$100 + 16 \times 9$ 244	M1 A1		
2.		$R = \frac{100I}{PT}$ $= \frac{100 \times 30}{1500 \times 1}$ $= 2\%$	(M)1 M1 A1	3	o.e.
3.		$\frac{30^2}{\sqrt{300 + 100}}$ $\frac{900}{20}$ 45	M1 A1	2	Accept also 50
4.	a)	$x \geq 1.5$	B1	3	
	b)	Correct scale Inequality represented correctly 	M1 A1 f.t.		Or equivalent representation
5.	a)	-7 -1	B1 B1	3	
	b)	Accept answers between and including -2.7 and -2.8 ; 0.7 and 0.8	B1		Both correct
6.	a)	$\frac{5}{3} + \frac{17}{6}$ or $1\frac{4}{6} + 2\frac{5}{6}$	M1	4	
		$\frac{10}{6} + \frac{17}{6}$ $3\frac{9}{6}$			
		$4\frac{1}{2}$ $4\frac{1}{2}$	A1		o.e.
	b)	$\frac{21}{4} \times \frac{8}{27}$ $1\frac{5}{9}$	M1 A1		o.e.
7.	a)	$x^2 - 6x - 8x + 48 + 3x$ $x^2 - 11x + 48$	M1 A1	4	
	b)	i) $6x^2(2ax - 3b)$ ii) $2x(2ax - 3b)$	B1 B1		Accept $4ax^2 - 6bx$
8.		$8x^3y^6 \times \frac{1}{x^5}$	M1	2	
		$\frac{8y^6}{x^2}$	A1		o.e.

MAIN PAPER (75 marks)

Ques.		Requirements				Mark		Additional Guidance																										
1.	a)	<table><tr><td colspan="2" rowspan="2"></td><td colspan="4">Jumpers</td></tr><tr><td>R</td><td>B</td><td>W</td><td>Y</td></tr><tr><td rowspan="3">Skirts</td><td>B</td><td>R, B</td><td>B, B</td><td>W, B</td><td>Y, B</td></tr><tr><td>G</td><td>R, G</td><td>B, G</td><td>W, G</td><td>Y, G</td></tr><tr><td>W</td><td>R, W</td><td>B, W</td><td>W, W</td><td>Y, W</td></tr></table>						Jumpers				R	B	W	Y	Skirts	B	R, B	B, B	W, B	Y, B	G	R, G	B, G	W, G	Y, G	W	R, W	B, W	W, W	Y, W	B2	4	Accept also possibility space filled by first listing skirts and then jumpers B1 for every 6 correct entries
										Jumpers																								
						R	B			W	Y																							
						Skirts	B	R, B	B, B	W, B	Y, B																							
G	R, G	B, G	W, G	Y, G																														
W	R, W	B, W	W, W	Y, W																														
	b)	i) $\frac{1}{4}$				B1		o.e.																										
		ii) $\frac{1}{6}$				B1		o.e.																										
2.	a)	6x + 48 = 360 6x = 312 x = 52°				M1 A1	6	o.e.																										
		b)				M1 M1																												
	c)				B2	B1 for every 3 correct hexagons drawn																												
3.		a = 58 ÷ 2 = 29° Angle at centre is twice angle at circumference b = 180 – 90 – 62 = 28° Angle in a semicircle is a right angle; Angles in a triangle				A1 M1 A1 M1	4	M1 for any of the two theorems stated																										
4.	a)	2(3x + 2) – 5(x – 1) = 10(6) 6x + 4 – 5x + 5 = 60 x + 9 = 60 x = 51				M1 M1 A1	9	Do not penalise if variables are interchanged throughout the question																										
	b)	i) 2x + y = 17 3x – 2y = 15 ii) Valid method used to eliminate one variable Valid attempt at substituting the value of 1 st variable to find the 2 nd variable x = 7 y = 3				B1 B1 M1 M1 A2																												
5.	a)	x ² = 44.65 ² + 3.46 ² x = $\sqrt{2005.5941}$ = 44.7838... x = 44.8 m				M1 (M)1 A1	6	Accept 44.8 m or more accurate																										
						b)			Tan a = $\frac{3.46}{44.65}$ Tan a = 0.07749... a = Tan ⁻¹ (0.07749...) = 4.4310... a = 4.4°				M1 M1 A1																					

6.	a)	$\frac{75 \times 1976}{100}$ 1482	M1 A1	6	
	b)	i) 5625 ii) $(1482 \times 5) + (1976 \times 4) + (1182 \times 3) + (709 \times 2) + (276 \times 1)$ $20554 \div 5625$ 3.654... iii) 4 star	B1 f.t. M1 A1 f.t. B1		f.t. from (a) Accept 3.7 or more accurate f.t. from (a) and b(i)
7.	a)		B1	5	Evidence that there are 9 vertical rectangles and 8 horizontal rectangles (4 on top and 4 at the bottom)
	b)	$4n + 1$	B1		
	c)	69	B1 f.t.		f.t. from (b)
	d)	$4n = 273 - 1$ $n = 68$	M1 A1 f.t.		f.t. from (b)
8.	a)	Correct axes and scale used Correct plotting of line	B2 B1	7	
	b)	$\frac{\text{change in } y}{\text{change in } x}$ 3	M1 A1		
	c)	-2	A1		
	d)	$y = 3x - 2$	A1 f.t.		f.t. from (b) and (c)
9.	a)	$\pi \times 1.25^2 \times 8.5$ 41.7242... cm ³	M1 A1	9	Accept 42 or more accurate
	b)	V of wooden cubic block = $8.5^3 = 614.125$ $\frac{41.7242...}{614.125} \times 100$ 6.794... %	M1 M1 A1 f.t.		Accept 6.8 or more accurate f.t. from (a)
	c)	$8.5^2 \times 6 = 433.5$ $(\pi \times 1.25^2) \times 2 = 9.8174...$ 433.5 - 9.8174... 423.682... cm ²	M1 M1 M1 A1		Accept 424 or more accurate

10.	a)				
		Bearing of 072° at B with line BC = 42.5 km Bearing of 333° (or angle of 27°) marked at B with line AB = 35 km	B1 B1	12	
	b)	Drawing of 72° angle at B Line BC of length 8.5 cm Drawing of 27° (or 333°) angle at B Line AB of length 7 cm	M1 M1 M1 M1		(± 1°) (± 0.1 cm) (± 1°) (± 0.1 cm)
	c)	i) $AC \times 5$ 59 km ii) 108°	M1 A1 f.t. B1 f.t.		For using scale f.t. from (b) (± 1 km) f.t. from (b) (± 2°)
	d)	$T = \frac{D}{S} = \frac{59}{75}$ $0.78\dot{6} \times 60$ $47.2 \approx 47 \text{ min}$	M1 M1 A1 f.t.		M1 for time conversion f.t. from c(i)
11.	a)	$(360 - (140 + 36)) \div 2 = 92^\circ$ Angles at a point add up to 360° $x = (180 - 92) \div 2 = 44^\circ$ Equal angles in an isosceles triangle	M1 M1 M1 M1	7	
	b)	Length of arc = $\frac{140}{360} \times 2 \times \pi \times 9.7$ $= 23.7015\dots$ Per = $23.7015\dots + (14 \times 2) + (9.7 \times 2)$ $= 71.1015\dots$ $= 71 \text{ cm}$	M1 (M)1 A1		