



## Annual Examinations for Secondary Schools 2014

---

### FORM 3

### MATHEMATICS

### MARKING SCHEME

---

#### Notes for Marking of Scripts

##### *Types of Marks*

- **M**(ethod) 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. In general a correct method is implied by a correct answer and therefore **when a correct answer is given and no work is shown, no method marks are lost.**
- **A**(ccuracy) marks are 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 (M) or accuracy (A) marks are awarded when a wrong method leads to a correct answer.
- **B** marks are accuracy marks awarded for specific results or statements independent of the method used.

##### *Misreading*

M marks can still be earned (unless that part of the question is trivialized) but the final A marks are lost.

##### *Crossed out working*

An answer or working that is crossed out and not replaced is marked as if it was 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.

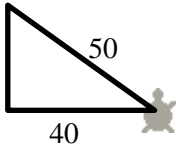
##### *Units*

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

##### *Other*

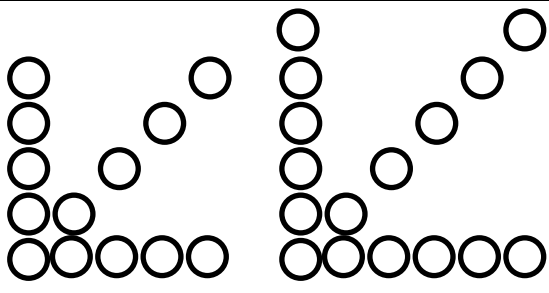
- Incorrect working or statement following a correct answer is ignored.
- Marks are not sub-divisible; no half marks may be awarded.
- Other abbreviations used:
  - o.e. (or equivalent)
  - e.e.o.o. (each error or omission)
- Markers are advised to indicate the M, A or B marks awarded in the body of 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)**

Question No.		Requirements	Marks	
1.	a)	$3.61 \times 10^8$	B1	5
	b)	i. $\frac{16}{5} - \frac{13}{10} = \frac{32}{10} - \frac{13}{10} = \frac{19}{10} = 1\frac{9}{10}$ ii. $\frac{5}{2} \times \frac{4}{3} = \frac{10}{3} = 3\frac{1}{3}$	M1 A1 M1 A1	
2.	a)	 50 t.s. seen	B1	3
	b)	120 t.s.	B1	
3.		$\frac{4}{100} \times 1600 = 4 \times 16 = \text{€}64$	M1 A1	2
4.	a)	$\frac{5-1}{3-(-1)} = \frac{4}{4} = 1$	M1 A1	3
	b)	(C) $y = x + 2$	B1	
5.	a)	>	B1	4
	b)	<	B1	
	c)	<	B1	
	d)	=	B1	
6.		(A) 42 cm	B1	1
7.		$1 - \left(\frac{4}{5} + \frac{1}{10}\right)$	M1	2
		$\frac{1}{10}$ (award 1 mark only if $\frac{9}{10}$ is seen or implied)	A1	
8.		$\frac{12 \times 10}{15} = \frac{120}{15} = \frac{40}{5}$ (or any other valid method)	M1	2
		8 days	A1	
9.		$90^\circ$ seen or implied	M1	3
		$x = 180^\circ - (90^\circ + 50^\circ)$ or $90^\circ - 50^\circ$	M1	
		$x = 40^\circ$	A1	
			<b>Total Marks</b>	<b>25</b>

**Main Paper (75 marks)**

Question No.	Requirements	Marks
1.	a) 15 m/s	B1
	b) 30 sec	B1
	c) 20 sec	B1
	d) 100 sec	B1
2.	a) $20 - (1 + 2 + 8 + 3) = 6$ Correct bar	M1 A1
	b) $\frac{1}{20}$	B1
	c) $(1 \times 0) + (2 \times 1) + (6 \times 2) + (8 \times 3) + (3 \times 4) = 50$ $\frac{50}{20}$ 2.5 h (f.t. for wrong answer in (a))	M1 M1 A1 (f.t.)
3.	$\frac{15}{83.95} \times 100 = 17.9\%$ or $\frac{16}{100} \times 83.95 = \text{€}13.43$ Buy 4 Less	M1 A1
4.	i. 20, 10 100 (both correct)	B1 B1
	ii. $\frac{20 \times (10)^2}{\sqrt{100}} \approx \frac{2000}{10} \approx 200$	B1
	iii. 200.173	B1
	iv. Yes, as the actual answer is only 0.173 bigger than the estimate. (or any other valid reason)	B1
	b) Eg. Correcting to 2 d.p. surely gives the answer in <b>cent</b> . <b>Cent</b> seen in valid reason	B1
5.	a) $x + y = 22$	B1
	b) He got a total of 42 points. (o.e.)	B1
	c) $3x - y = 42$ $x + y = 22$ $4x = 64$ $x = \frac{64}{4}$ $x = 16$ obstacles (or any other valid method)	M1 A1
	d) Eg. At the <b>point of intersection</b> $x = 16$ , $\therefore$ answer is correct. <b>Point of intersection</b> seen in valid reason	B1

6.	a)	i. $5x^2 + 10xy$ ii. $x^2 - x + 3x - 3 = x^2 + 2x - 3$	B1 M1 A1	9
	b)	$\frac{x(3x+2y)}{5xy} = \frac{3x+2y}{5y}$	M1 A1	
	c)	i. $2x + 5 + 3x - 11 + 9x$ $14x - 6$ $2(7x - 3)$ ii. $2x + 5 = 3x - 11$ $5 + 11 = 3x - 2x$ $16 = x$	M1 A1  M1 A1	
7.	a)		B1 B1	7
	b)	10, 13, 16 (all correct)	B1	
	c)	$3n + 1$ Correct $3n$ Correct $+1$	B1 B1	
	d)	$3(25) + 1$ 76 squares	M1 A1	
8.	a)	Scalene	B1	3
	b)	$(\frac{5}{9} \times 180)$ or $(180 \div 9) \times 5$ $100^\circ$	M1 A1	
9.	a)	$V = \pi \times 6.5^2 \times 12 = 1592.787\dots$ $1590 \text{ cm}^3$	M1 A1	4
	b)	C.S.A = $2 \times \pi \times 6.5 \times 12$ $490 \text{ cm}^2$	M1 A1	
10.	a)	$540^\circ, 720^\circ, 900^\circ$ (any two correct entries)	B2	4
	b)	$x = 720^\circ - (125^\circ + 117^\circ + 95^\circ + 176^\circ + 90^\circ)$ $x = 117^\circ$ (f.t. for incorrect $720^\circ$ in (a))	M1 A1 (f.t.)	
11.	a)	(B) $y = x^2 - 5x + 5$	B1	5
	b)	$y = -1.25 (\pm 0.05)$	B1	
	c)	(C) $x = 2.5$	B1	
	d)	$x = 0.7$ or $4.3$	B1 B1	

12.	a)	$100I = PTR$ $\frac{100I}{PR} = T$	M1 A1	4
	b)	$T = \frac{100 \times 718.20}{2565 \times 3.5}$ $T = 8 \text{ years}$	M1 A1	
13.		$5.8 \div 2 = 2.9$ (seen or implied) $\sin x = \frac{2.9}{8.3} = 0.3493\dots$ $\angle x = 20.45\dots^\circ$ $\angle XAY = 20.45\dots^\circ \times 2 = 40.9^\circ$ $41^\circ$	M1 M1 M1 M1 A1 (f.t.)	5
14.		Correct details in diagram seen or implied $\tan 42^\circ = \frac{x}{18.2}$ $x = \tan 42^\circ \times 18.2$ $BL = 16.4 \text{ km}$	M1 M1 A1	3
15.	a)	Area of courtyard = $10 \times 12 = 120 \text{ m}^2$ Area of sector = $(\pi \times 8^2) \div 4$ $= 50.265\dots$ $\frac{50.265\dots}{120} \times 100 =$ $41.9\%$	B1 M1 M1 M1 A1 (f.t.)	8
	b)	$\text{Hyp}^2 = 10^2 + 12^2$ $\text{Hyp} = \sqrt{244}$ $\text{Hyp} = 15.6 \text{ m}$	M1 A1	
	c)	Yes. With radius 8 m, each spotlight will reach more than halfway along the diagonals and all the courtyard is lit. (or any other valid reason)	B1	
			<b>Total Marks</b>	75