

KULLEĠĠ SAN BENEDITTU

Secondary School, Kirkop

HALF YEARLY EXAMINATION – 2015/2016

TRACK

3

FORM 3

MATHEMATICS

Marking Scheme

Aids 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 mark 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 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 mark scheme.

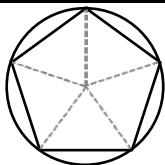
Other

- Incorrect working or statements following a correct answer are 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 (Total: 25 Marks)

Quest.		Requirements	Mark	Additional Guidance	
1.		$\frac{16}{3} + \left(\frac{18}{5} \times \frac{5}{3}\right)$	M1		4
		$\frac{16}{3} + \frac{18}{3}$	M1		
		$\frac{34}{3}$	M1		
		$11\frac{1}{3}$	A1		
2.	i	40,080,000	A1		2
	ii	4.008×10^7	A1		
3.		$\frac{210 \times 2}{3}$	M1		2
		140 min or 2.3 hours or $2\frac{1}{3}$ hours	A1		
4.		5, 12, 13 triangle (× 2) $12 \times 2 = 24$	B1		1
5.	i	$R = \frac{100 I}{PT}$	M1A1	Seen or implied	5
	ii	$24 \div 12 = 2$ years			
		$R = \frac{100 \times 450}{9000 \times 2}$	M1		
		$R = \frac{45000}{18000}$ $R = 2.5$	M1 A1		
6.		$\frac{360}{10} = 36$		Seen or implied	3
		PD REPEAT 10 [FD 40 RT 36] END	B3		
7.		Modes 5, 9	B1		3
		Median 5, 5, 5, 6, 7, 8, 8, 9, 9, 9	M1		
		$\frac{7 + 8}{2} = 7.5$	A1		
8.	i	$\frac{4y^2(y + 2)}{2y(y + 2)}$	M1		5
		$= 2y$	A1		
	ii.	$4x + 12 - 2x + 6 = 6$	M1		
		$2x = -12$ $x = -6$	M1 A1		

MAIN PAPER (Total: 75 Marks)

Quest.	Requirements	Mark	Additional Guidance	
1.	$\approx \frac{2000 + 400}{30}$ $= 80$	B2 A1	-1 e.e.o.o.	3
2.	$ps = 3q - r$ $ps + r = 3q$ $q = \frac{ps + r}{3}$	M1 M1 A1		3
3.	$\frac{70 \times 100}{80}$ $= €87.50$	M2 A1	M1 for 80% (seen or implied)	3
4.	$x^2 + x = 17$ when $x = 3$ ans 12 when $x = 4$ ans 20 when $x = 3.5$ ans 15.75 when $x = 3.6$ ans 16.56 when $x = 3.7$ ans 17.39 $x = 3.7$	M1 M1 A1	for substituting at least 2 values for substituting BOTH 3.6 and 3.7	3
5.	a) x^2, x^8 b) a^7, a^8, a^{20}	B2 B2	 -1 e.e.o.o.	4
6.	a) $3 + 2 + 1 = 6$ $240 \div 6 = 40$ $40 \times 2 = 80$ b) 9	M1 M1 A1 B1		4
7.	a) $x^2 - 2x + 5x - 10$ $x^2 + 3x - 10$ b) $(x + 4)(x + 4)$ $x^2 + 4x + 4x + 16$ $x^2 + 8x + 16$	M1 A1 M1 A1	Allow 1 error Allow 1 error	4
8.	a)  b) PQ = 4.7 (± 0.2)	M1 M1 A1 A1	for drawing circle, radius 4 ± 0.2 cm for finding 72° correct pentagon	4
9.	a) Rachel's mean mark is $\frac{112}{7} = 16$ b) Audrey's mean mark is $\frac{102}{6} = 17$ Rachel's mean is lower than Audrey's.	M1, A1 B1 B1	do not award mark if 17 is not seen	4

10.	a)	1, 3, 5.	B1	all correct	6
	b)	i) 10	B1		
		ii) $2n + 2$	B1, B1		
		iii) $2n + 2 = 20$ $n = 9$	M1 A1		
11.	a)	$AC^2 = AB^2 + BC^2$ $11.5^2 = 9^2 + BC^2$ $BC^2 = 51.25$ $BC = \sqrt{51.25} = 7.158\dots$ $BC = 7.2$	M1 M1 M1 A1		6
	b)	Area = $9 \times 7.158\dots$ $= 64.430\dots$ $= 64.4$	M1 A1f.t.		
12.	a)	$2x + 16$	B1	o.e.	7
	b)	$6x$	B1	o.e.	
	c)	$6x = 2x + 16$ $4x = 16$ $x = 4$	M1 M1 A1	Equating answers in a) and b) Collecting like terms	
	d)	$8 + 4 + 8 + 4 = 24$	M1 A1		
13.	a)	$48 \times 2.5 = 120$	M1 A1		8
	b)	$120 + 30 = 150$	B1	f.t. for incorrect answer in part a)	
	c)	$\frac{30 \times 3}{2} = 45$	M1 A1	o.e.	
	d)	3hrs 10min $\frac{150 \times 60}{220}$ $= 41\text{km/hr}$	B1 M1 A1	seen or implied f.t. from b)	
14.	a)	7,690,000	B1		7
	b)	Australia, South America, North America, Europe, Africa, Asia	B1 B1	Largest and smallest correct Fully correct answer	
	c)	$1.11 \times 10^9 - 7.30 \times 10^8$ $= 3.8 \times 10^8$	M1 A1	accept 380,000,000	
	d)	Daniel It is the only answer which is correct to 3 significant figures	B1 B1		

15.	a)	hexagon	B1		9
	b)	$180(n - 2)$ $= 180(4)$ $= 720^\circ$	B1 A1	recalling formula (seen or implied)	
	c)	$3x + 6x + 145 + 5x + 4x + 45 + 4x - 20 = 720$ $22x = 550$ $x = 25$	M1 A1	f.t. from part b)	
	d)	$\angle ABC = 5(25) = \underline{125^\circ}$ $\angle DCB = 4(25) + 45 = \underline{145^\circ}$ $\angle CBP = 180 - 125$ $= 55^\circ$ (\angle s on a straight line) $\angle BCP = 180 - 145$ $= 35^\circ$ (\angle s on a straight line) $\angle BPC = 180 - (55 + 35)$ $= 90^\circ$ (\angle s in a triangle)	M1 M1 B1 A1	finding BOTH $\angle ABC$ and $\angle DCB$ finding $\angle CBP$ or $\angle BCP$ ANY one correct reason f.t. from part c)	