



# KULLEĠĠ SAN BENEDITTU

## Secondary School, Kirkop

### HALF YEARLY EXAMINATION – 2016/2017

#### FORM 4 TRACK 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 (20 marks – 1 mark each)**

No. 1	No. 2	No. 3	No. 4	No. 5
$a$ (o.e.)	3	2	$12c^2 + 4c - 3cd - d$	2700
No. 6	No. 7	No. 8	No. 9	No. 10
$3.61 \times 10^{-2}$	96	$\frac{2A}{h} - a = b$ o.e.	$4xy$	A
No. 11	No. 12	No. 13	No. 14	No. 15
100	5	<i>Any 3 boxes shaded</i>	150	$(3x + 2)(x - 3)$
No. 16	No. 17	No. 18	No. 19	No. 20
$\frac{12}{13}$	$y = 2x + 7$	4	50	$a^0$ (or 1), $a^4$ <i>both correct</i>

**MAIN PAPER (80 marks)**

Quest.	Requirements	Marks	Additional Guidance	Tot
1.	$4375 = 5 \times 5 \times 5 \times 5 \times 7$ $= 5^4 \times 7$ $x = 4$ and $y = 7$	M1 A2	Attempts to factorise	3
2.	$1.675 \times 10^{-24} \times 8.5 \times 10^{14}$ $= 14.2375 \times 10^{-10}$ $= 1.42375 \times 10^1 \times 10^{-10}$ $= 1.42375 \times 10^{-9}$ $= 1.42 \times 10^{-9}$	M1 M1 A1 A1	Attempts to multiply  (seen or implied) Answer in standard form Answer correct to 2 d.p.	4
3.	$48 \text{ m} - 32 \text{ m} = 16 \text{ m}$ Attempts to use Pyth Thm $d = \sqrt{25^2 - 16^2}$ $= 19.2093... \text{ m}$	M1 M1 M1 A1	Do not penalise rounding	4
4.	a) $\div 1,000,000$ $75.3 \text{ m}^3$	M1 A1	seen or implied	5
	b) 54 litres	B1		
	c) $\times 1,000,000$ $4,100,000 \text{ m}^2$	M1 A1	seen or implied	

5.	a)	$3a^2 + 2a - 12a - 8$ $-2a^2 + a$ $= a^2 - 9a - 8$	B1 B1 M1A1	Allow 1 error Collecting like terms	8
	b)	i) $2a^2(2ab - 9)$ ii) $(x + 7)(x - 6)$	B2 B2	B1 for each factor -1 e.e.o.o.	
6.		$100\% - 10\% = 90\%$ or 0.9 $€1200 \times 0.9$ $\times 0.9$ $= €972$	M1 M1 M1 A1	Or any other valid method	4
7.	a)	$y = \frac{10 - 2^2}{3(2^2)}$ $y = \frac{10 - 4}{12}$ $= 0.5$	M1 M1 A1	o. e.	7
	b)	$ywx^2 = z - x^2$ $ywx^2 + x^2 = z$ $x^2(yw + 1) = z$ $x^2 = \frac{z}{yw + 1}$ $x = \pm \sqrt{\frac{z}{yw + 1}}$	M1 M1 M1 A1	Do not penalise for omission of $\pm$	
8.		$x^2 - 15x + 26 = 0$ $(x - 2)(x - 13) = 0$ Either $x - 2 = 0$ or $x - 13 = 0$ $x = 2$ or $x = 13$	M1 M1 M1 A1	Do not accept other methods seen or implied both correct	4
9.		$S.I. = \frac{PTR}{100}$ $= \frac{3200 \times 7 \times 3.6}{100} = €806.40$  $A = 3200(1 + \frac{4.4}{100})^5 = €3968.74$ Interest = €768.74 Scheme A by €37.66	M1 M1A1  M2 M1 A2	or other valid method  for working out the amount for subtracting the principal	8

10.	a)	$\tan 63^\circ = \frac{80}{AD}$ $AD = \frac{80}{\tan 63^\circ}$ $= 40.76203596 \approx 40.8$	M1 M1 A1		8
	b)	$\tan 22^\circ = \frac{ED}{40.76203596}$ $40.76203596 \times \tan 22^\circ = ED$ $16.46893155 = ED$  $80 \text{ m} + 16.4689 \dots = 96.5 \text{ m}$	M1 M1 A1 M1A1		
11.	a)	14, 18, 22	B2	-1 e.e.o.o.	8
	b)	$4n + 2$	B2		
	c)	$4n + 2 = 55$ $4n = 53$ $n = \frac{53}{4} = 13.25$ $n$ is not a whole number	M1 M1 A1 B1	Accept other methods	
12.	a)	30, 70	B2		11
	b)	Labelling of axes plotting 3 points plotting all points joining points to form a straight line	M1 M1 M1 A1		
	c)	$\text{€}64 \pm 2$	B1	Do not accept other methods	
	d)	Picking any two points on the line Use $\frac{\text{change in } y}{\text{change in } x}$ appropriately	M1 M1		
	e)	This line is <b>not</b> parallel. Although the fixed charge is the same, the rate per kilometre travelled (gradient) is different.	B1 M1	Accept other valid reasons	
13.	a)	i) $\text{Area of trapezium} = \frac{(a+b)h}{2}$ $= \frac{(3+4)(1.2)}{2}$ $= 4.2 \text{ m}^2$  ii) $\text{Volume} = 4.2 \times 3 = 12.6 \text{ m}^3$	M1 A1 M1A1		6
	b)	$12.6 \text{ m}^3 = 12600 \text{ litres}$ $\text{Time} = \frac{12600}{2} = 6300 \text{ sec}$ $= 105 \text{ mins}$ $= 1 \text{ hour } 45 \text{ mins}$	M1 A1		