

KULLEĠĠ SAN BENEDITTU
Boys Secondary School, Kirkop



HALF-YEARLY EXAMINATIONS – FEBRUARY 2013

FORM 4

MATHEMATICS Scheme A

TIME: 20 mins

Non Calculator Paper

| | | | | | | | | | | | | | | | | | | | | | | |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|-------|--|
| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | Total | |
| Mark | | | | | | | | | | | | | | | | | | | | | | |

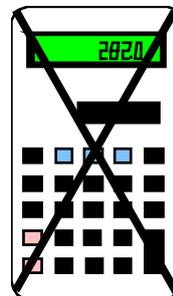
DO NOT WRITE ABOVE THIS LINE

NAME AND SURNAME: _____ CLASS: _____

INSTRUCTIONS TO CANDIDATES:

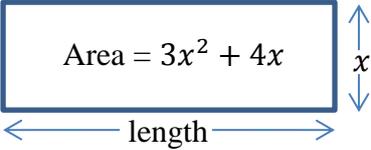
Read all the questions carefully before you start answering.

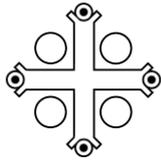
- Answer all questions.
- This paper carries 20 marks.
- **Calculators, protractors** and other mathematical instruments are **NOT ALLOWED**.
- On your desk you should have nothing except for **pen, pencil, ruler** and the **examination paper**.
- You are not required to show your working. However, space for working is provided if you need it.



| No. | Question | Space for working, if required. |
|-----|--|---------------------------------|
| 1 | In a class of 20 students, 13 come to school by bus. The rest come on foot. What percentage of the students, come to school on foot ? <div style="text-align: right;">_____</div> | |
| 2 | Factorise: $4x^2 - 6x$ <div style="text-align: right;">_____</div> | |
| 3 | Evaluate: $2^3 + 2^1 + 2^0 - 2^2$ <div style="text-align: right;">_____</div> | |
| 4 | Find the n^{th} term of: $4, 7, 10, 13, 16$ <div style="text-align: right;">_____</div> | |
| 5 | Evaluate: $98^2 - 2^2$ <div style="text-align: right;">_____</div> | |
| 6 | A television set has a sale price of €150. This is a saving of 25% on the original price. What was the original price ? <div style="text-align: right;">_____</div> | |
| 7 | Find x , given that $x = \frac{y^2}{z}$, when $y = -4$ and $z = 2$. <div style="text-align: right;">_____</div> | |

| | | |
|----|--|--|
| 8 | Convert 3cm^2 to mm^2 _____ | |
| 9 | Find the value of n : $(2^n)^{-4} = \frac{1}{2^8}$ _____ | |
| 10 | Calculate, giving your answer in standard form: $(2.5 \times 10^3) \times (4 \times 10^4)$ _____ | |
| 11 | Simplify: $\sqrt{\frac{49q^{10}}{r^4}}$ _____ | |
| 12 | The sides of 4 different triangles are: A. 20cm, 30cm, 40cm B. 0.6m, 0.4m, 0.3m C. 6m, 8m, 9m D. 0.3cm, 0.4cm, 0.5cm Which one of the above triangles is right-angled ? _____ | |
| 13 | Solve : $x^2 - 5x = 0$ _____ | |
| 14 | A line passes through (0, 5) and (2, 10). Find its gradient . _____ | |

| | | | | | | | | | | | | |
|-----------|--|---------|---------|----------|---------|----------|-----------|---|---|---|---|--|
| 15 | <p>Write down an expression for the length of the rectangle in terms of x.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">_____</p> </div> | | | | | | | | | | | |
| 16 | <p>The area of a triangle is 30 cm^2. If the perpendicular height is 10cm, find the length of the base.</p> <p style="text-align: right;">_____</p> | | | | | | | | | | | |
| 17 | <p>The mean of five numbers is 110. If four of these numbers are: 100, 150, 75 and 125. Find the 5th number.</p> <p style="text-align: right;">_____</p> | | | | | | | | | | | |
| 18 | <p>The volume of a cube is 125 m^3. What is the length of the cube?</p> <p style="text-align: right;">_____</p> | | | | | | | | | | | |
| 19 | <p>This frequency table shows the distribution of marks in an exam of a class of 21 students. Which class interval contains the median mark?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>Marks</td> <td>1 – 25</td> <td>25 – 50</td> <td>50 – 75</td> <td>75 – 100</td> </tr> <tr> <td>Frequency</td> <td>3</td> <td>5</td> <td>8</td> <td>5</td> </tr> </tbody> </table> <p style="text-align: right;">_____</p> | Marks | 1 – 25 | 25 – 50 | 50 – 75 | 75 – 100 | Frequency | 3 | 5 | 8 | 5 | |
| Marks | 1 – 25 | 25 – 50 | 50 – 75 | 75 – 100 | | | | | | | | |
| Frequency | 3 | 5 | 8 | 5 | | | | | | | | |
| 20 | <p>Angle A is an acute angle of a right-angled triangle.</p> <p>Find Tan A, given that $\text{Cos A} = \frac{12}{13}$.</p> <p style="text-align: right;">_____</p> | | | | | | | | | | | |



KULLEĠĠ SAN BENEDITTU
Boys Secondary School, Kirkop



HALF-YEARLY EXAMINATIONS – FEBRUARY 2013

FORM 4

MATHEMATICS Scheme A

TIME: 1hr 40mins

Main Paper

| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Main | NC | Global Mark |
|-----------|---|---|---|---|---|---|---|---|---|----|----|----|------|----|-------------|
| Max. Mark | 5 | 5 | 7 | 4 | 7 | 6 | 6 | 9 | 9 | 8 | 8 | 6 | 80 | 20 | 100 |
| Mark | | | | | | | | | | | | | | | |

DO NOT WRITE ABOVE THIS LINE

NAME AND SURNAME: _____ **CLASS:** _____

INSTRUCTIONS TO CANDIDATES:

Read all the questions carefully before you start answering.

- Answer all questions.
- This paper carries 80 marks.
- Calculators and mathematical instruments are allowed but all necessary working must be shown.

1. (a) Simplify: $\frac{1}{4}(12 + 2d) =$

(b) Write as a **single fraction** and simplify: $\frac{2x+9}{8} - \frac{x+1}{4}$

(5 marks)

2. (a) Simplify:

i) $z^3 \times z^5 \times z^{-8} =$

ii) $\frac{4x^2 \times 6x^5}{12x^3} =$

(b) Given that $x = 2 \times 10^{-3}$ and $y = 7 \times 10^{-4}$, express $\mathbf{x} \times \mathbf{8y}$ in standard form.

(5 marks)

3. (a) Make b subject of the formula: $a = \frac{4(b+c)}{bc}$

$b =$ _____

(b) The power, in watts, dissipated in an electric circuit is given by $W = I^2R$.
 I stands for the current in amps. R is the resistance of the circuit in ohms.

i) Rearrange the formula to give I in terms of W and R .

$I =$ _____

ii) Calculate the current (I) in an electric circuit where $W = 120$ watts
and $R = 10.25$ ohms. Give your answer to 3 significant figures.

$I =$ _____

(7 marks)

4. (a) Write the prime factorisation of 240 and 300.

$$240 = \underline{\hspace{2cm}} \quad 300 = \underline{\hspace{2cm}}$$

(b) **Hence** find the LCM of 240 and 300

$$\text{LCM} = \underline{\hspace{2cm}}$$

(4 marks)

5. Daniel wants to sell his car. He reduced the selling price of his car from €6,300 to €6,000.

(a) What was the percentage decrease in price? Give your answer correct to 1 d.p.

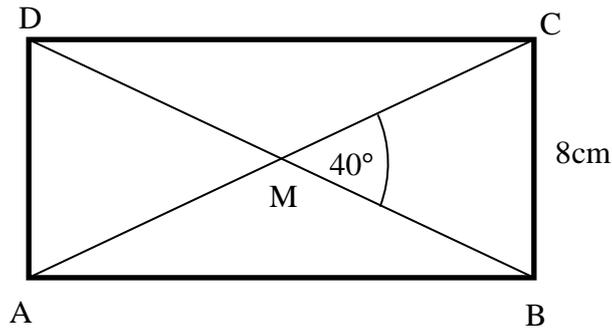
After he reduced the price to €6000, he still could not sell the car so he reduced its price by a further 6.5%.

(b) What was the final selling price to the nearest Euro?

(c) Calculate the overall percentage decrease in price correct to the nearest whole number.

(7 marks)

6.



(a) What type of triangle is $\triangle MBC$? _____

(b) The acute angle between the diagonals in this rectangle is 40° . Find $\angle MCB$.

$\angle MCB = \underline{\hspace{2cm}}^\circ$

(c) The width of the rectangle is 8cm. Find the length AB of the rectangle correct to the nearest centimetre.

AB = _____ cm
(6 marks)

7. (a) Write the next three terms of this sequence: 3, 12, 27, 48, _____, _____.

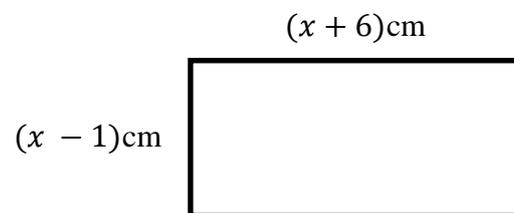
(b) Find the n^{th} term of the above sequence.

(c) Write down the term which gives 300.

(6 marks)

8. (a) Solve the equation: $y^2 + 5y + 1 = y - 2$

(b) The length and width of a rectangle are shown below:



The rectangle has an area of 44cm^2 .

i) Form an equation in terms of x , for the area of the rectangle and show that it can be written as $x^2 + 5x - 50 = 0$

ii) Solve to find x

$x =$ _____

(9 marks)

9. (a) Mr and Mrs Saliba bought a house in 2011 for €160,000.

The house increases in value by 3% each year.

What will the house be worth in the year 2014 correct to the nearest Euro?

€ _____

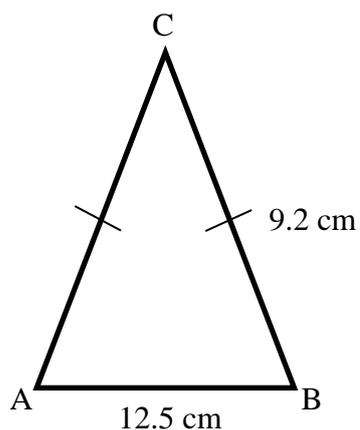
(b) Mr and Mrs Saliba changed their living room. The following table shows their expenses. After buying all the following items, the couple were given a 2% showroom discount, and afterwards VAT was added to the discounted price.

Fill in **all** the missing values in the table, showing all necessary working.

| <u>ITEMS</u> | <u>EXPENSES (€)</u> |
|-------------------------------|---------------------|
| 1 TV Set | 150 |
| 1 Leather Sofa | 1,200 |
| 1 Arm Chair | 450 |
| Fittings and other Expenses | 1,000 |
| TOTAL | |
| Total discounted by 2% | |
| VAT at 18% | |
| TOTAL DUE | |

(9 marks)

10.



(a) Find the perpendicular height of $\triangle ABC$. Give your answer correct to 2 decimal places.

(b) $\triangle ABC$ represents the cross section of a liquid container 10cm long. Calculate, in cm^3 , the volume of liquid in the container when full correct to nearest cm^3 .

(c) The liquid is removed from the container at 0.1 litres per second. How many seconds does the container take to be emptied completely?

(8 marks)

11. A botanist is investigating the effect of phosphorus nutrition on a group of plants. He measures the height of each plant to the nearest mm for a whole month. These are the values he recorded on one particular day.

23 75 44 31 63 58 65 47
 18 44 37 29 48 64 36 32
 53 83 43 57 52 46 45 77

- (a) Copy and complete the following table:

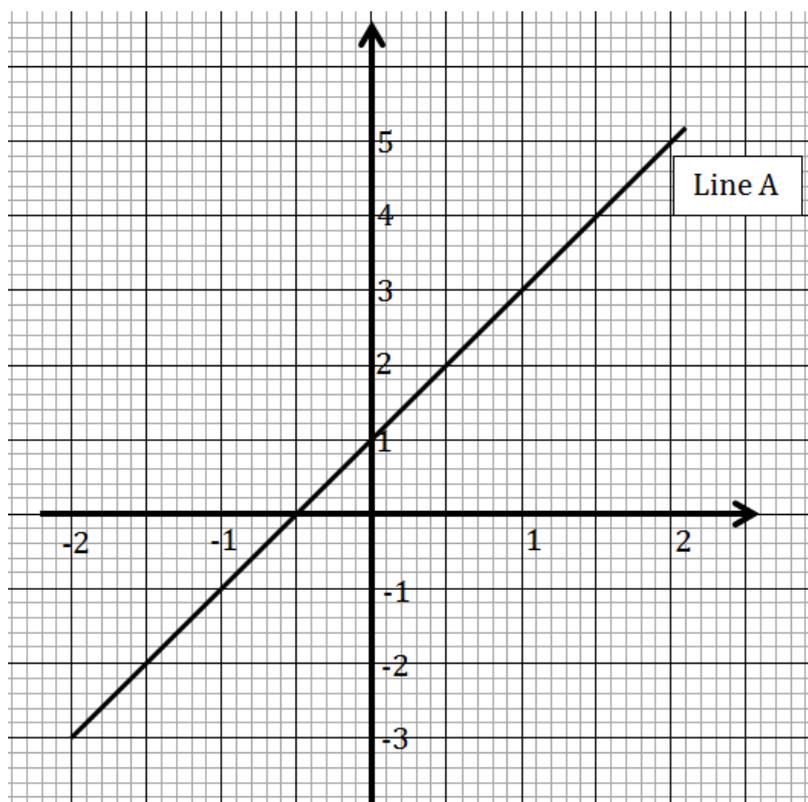
| Height (h) | Mid-value (x) | Frequency (f) | fx |
|------------------|-------------------|-------------------|---------|
| $10 \leq h < 20$ | | | |
| $20 \leq h < 30$ | | | |
| $30 \leq h < 40$ | | | |
| $40 \leq h < 50$ | | | |
| $50 \leq h < 60$ | | | |
| $60 \leq h < 70$ | | | |
| $70 \leq h < 80$ | | | |
| $80 \leq h < 90$ | | | |
| | | Total = | Total = |

- (b) Work out an estimate for the mean height.

- (c) Write down the modal group.

(8marks)

12.



(a) Work out the gradient of Line A

(b) Write down the equation of Line A.

(c) Write down the equation of a line which passes through the point (0, 4) and is parallel to Line A.

(6 marks)