

KULLEGG SAN BENEDITTU Secondary School, Kirkop

Mark

HALF YEARLY EXAMINATION – 2016/2017

Track 3

FORM 4

MATHEMATICS

TIME: 20 mins

Non Calculator Paper

Mark

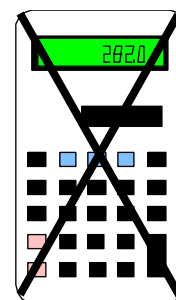
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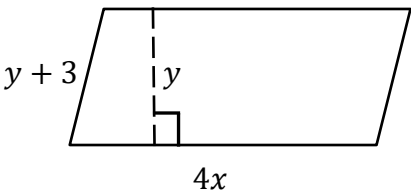
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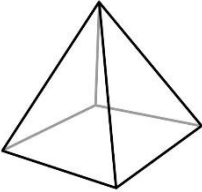
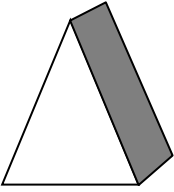
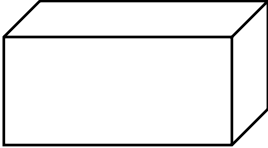
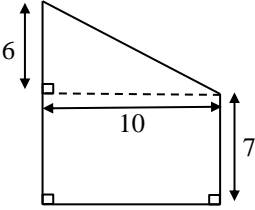

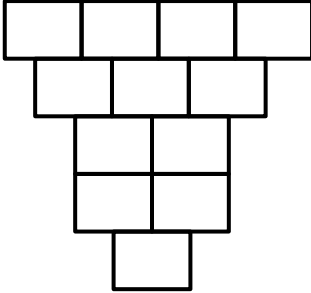
Class: _____

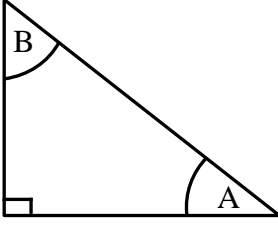
Instructions to Candidates

- Answer all questions.
- This paper carries a total of 20 marks.
- Calculators and protractors are NOT ALLOWED.

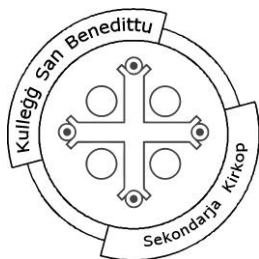


No.	Question	Space for working, if required.
1	Simplify: $\frac{(a^0 \times a^3)}{a^2}$ Ans: _____	
2	What is the value of x in $8^5 = (2^x)^5$? Ans: _____	
3	Work out the HCF of 24 and 70. Ans: _____	
4	Expand: $(4c - d)(3c + 1)$ Ans: _____	
5	Evaluate: $27 \times 32.2 + 27 \times 67.8$ Ans: _____	
6	Work out $36.1 \div 1000$. Give your answer in standard form . Ans: _____	
7	Work out $(9.8^2 - 0.2^2)$. Ans: _____	
8	Make b the subject of the formula: $A = \frac{h}{2}(a + b)$ Ans: _____	
9	Work out the area of this parallelogram in terms of x and y .  Ans: _____	

10	<p>Which one of these shapes is not a prism?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>A</p> </div> <div style="text-align: center;">  <p>B</p> </div> <div style="text-align: center;">  <p>C</p> </div> </div> <p style="text-align: right;">Ans: _____</p>	
11	<p>Work out the area of this trapezium. All lengths are in metres.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">Ans: _____ m²</p>	
12	<p>The shape of a chocolate packaging is a triangular prism. Calculate the area of cross-section of this packaging if its volume is 105 cm³ and its length is 21 cm.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">Ans: _____ cm²</p>	
13	<p>This shape is made up of equal rectangles. Shade $\frac{1}{4}$ of this shape.</p> <div style="text-align: center;">  </div>	

14	<p>A sum of €1500 is invested at a simple interest of 5% p.a. What is the interest gained after 2 years?</p> <p style="text-align: right;">Ans: € _____</p>	
15	<p>Factorise: $3x^2 - 7x - 6$</p> <p style="text-align: right;">Ans: _____</p>	
16	<p>In this right angled triangle, $\sin A = \frac{5}{13}$. What is the value of Sin B ?</p>  <p style="text-align: right;">Ans: _____</p>	
17	<p>What is the equation of the line passing through (0, 7) and parallel to the line $y = 2x - 3$?</p> <p style="text-align: right;">Ans: _____</p>	
18	<p>What is the gradient of a line with equation $2y - 8x = 3$?</p> <p style="text-align: right;">Ans: _____</p>	
19	<p>What is the 12th term of the sequence with n^{th} term $5n - 10$?</p> <p style="text-align: right;">Ans: _____</p>	
20	<p>Fill in the blanks for this sequence:</p> <p style="text-align: center;">_____, a, a^2, a^3, _____, a^5.</p>	

END OF NON CALCULATOR PAPER



KULLEGG SAN BENEDITTU

Secondary School, Kirkop

Mark

HALF YEARLY EXAMINATION – 2016/2017

Track 3

FORM 4

MATHEMATICS

TIME: 1 hr 40 mins

Main Paper

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	Main	NC	Global Mark
Max. Mark	3	4	4	5	8	4	7	4	8	8	8	11	6	80	20	100
Mark																

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Name: _____

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. Kirsten writes the number **4,375** as a product of its prime factors.
The result is $5^x \times y$ where x and y are positive integers. What are the values of x and y ?

Ans: $x =$ _____ $y =$ _____

(3 marks)

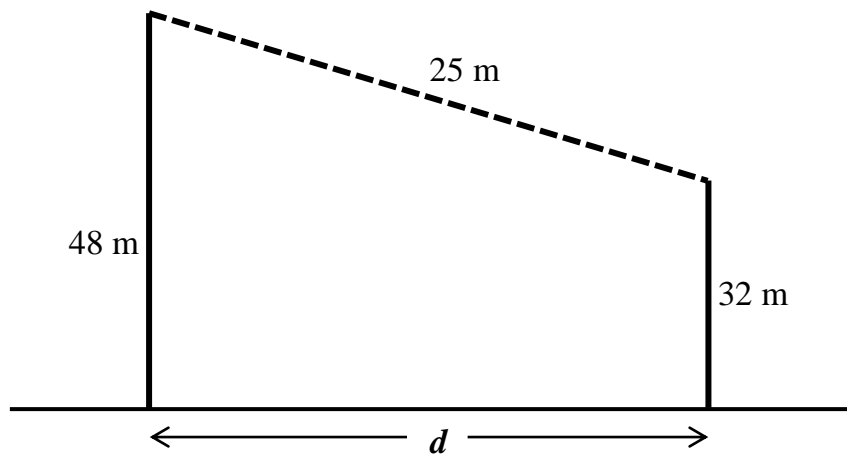
2. The mass of a neutron is 1.675×10^{-24} grams. Work out the mass of 8.5×10^{14} neutrons. Give your answer in **standard form**, correct to **2 decimal places**.

Ans: _____ grams

(4 marks)

3. Two vertical masts of a sailing ship have heights 48 m and 32 m. The distance between their highest points is 25 m.

Work out the distance d between the masts.



Ans: _____ m

(4 marks)

4. Convert the following:

a) $75,300,000 \text{ cm}^3$ to m^3 _____

b) $54,000 \text{ cm}^3$ to **litres** _____

c) 4.1 km^2 to m^2 _____

(5 marks)

5. a) Expand and simplify: $(a - 4)(3a + 2) - a(2a - 1)$

Ans: _____

- b) Factorise:

i) $4a^3b - 18a^2$

ii) $x^2 + x - 42$

Ans: _____

Ans: _____

(8 marks)

-
6. Kate buys a notebook for €1200. A few months later she sells it to Pam at a loss of 10%. Pam decides to sell it to Tina at a loss of 10%.

How much did Tina pay for this notebook?



Ans: € _____

(4 marks)

7. For the formula: $y = \frac{z-x^2}{wx^2}$

a) work out the value of y when $z = 10$, $x = 2$ and $w = 3$.

Ans: $y =$ _____

b) make x the **subject** of the formula.

Ans: $x =$ _____

(7 marks)

8. Solve this quadratic equation by **factorisation**.

$$x^2 + 26 = 15x$$

Ans: $x =$ _____ and $x =$ _____

(4marks)

9. Tescoat Company offers two schemes of investment.



Scheme A

Sum is invested for 7 years at **simple interest** with an interest rate of 3.6% per annum.

Scheme B

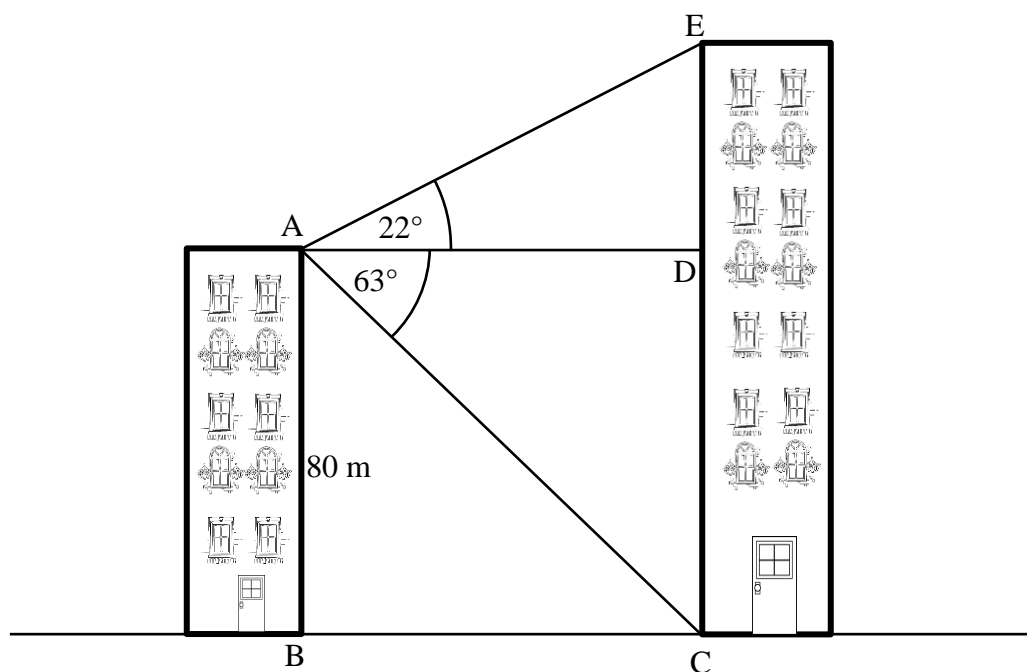
Sum is invested for 5 years **compound interest** with an interest rate of 4.4%.

Kate invests €3200. Which scheme yields the **highest** interest and by how much?
Show all necessary working.

Ans: Scheme _____ by € _____

(8 marks)

10. Jeremy stands at the top A of a block of flats, 80 m high. Opposite to him is another block of flats CDE. From A, the angle of elevation of E is 22° and the angle of depression of C is 63° . AD is a horizontal line.



Work out, giving your answer correct to **1 decimal place**:

- a) the distance AD

Ans: AD = _____m

- b) the height of the block EDC.

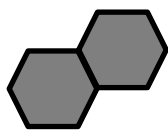
Ans: EDC = _____m

(8 marks)

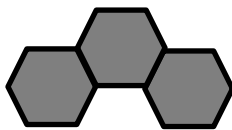
11. This pattern is made of regular hexagons.



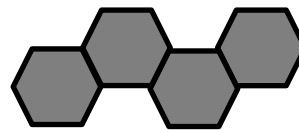
Pattern 1



Pattern 2



Pattern 3



Pattern 4

a) Complete the table.

Pattern Number	1	2	3	4	5
Perimeter of the Pattern	6	10			

b) Write down an equation for the perimeter of **Pattern n** .

Ans: _____

c) Explain why there is no pattern with a perimeter of 55.

(8 marks)

12. Jones Bros hire vans at a basic charge of €10 plus a further €0.40 per kilometre travelled.
 € y is the total hire charge when the van travels x km.

a) Complete the table:

x (km)	20	50	100	150	180
y (€)	18		50		82

- b) On the graph paper, found on the opposite page, plot a graph of y against x .
 Take 2 cm to represent 25 km on the x -axis and 2 cm to represent €10 on the y -axis.

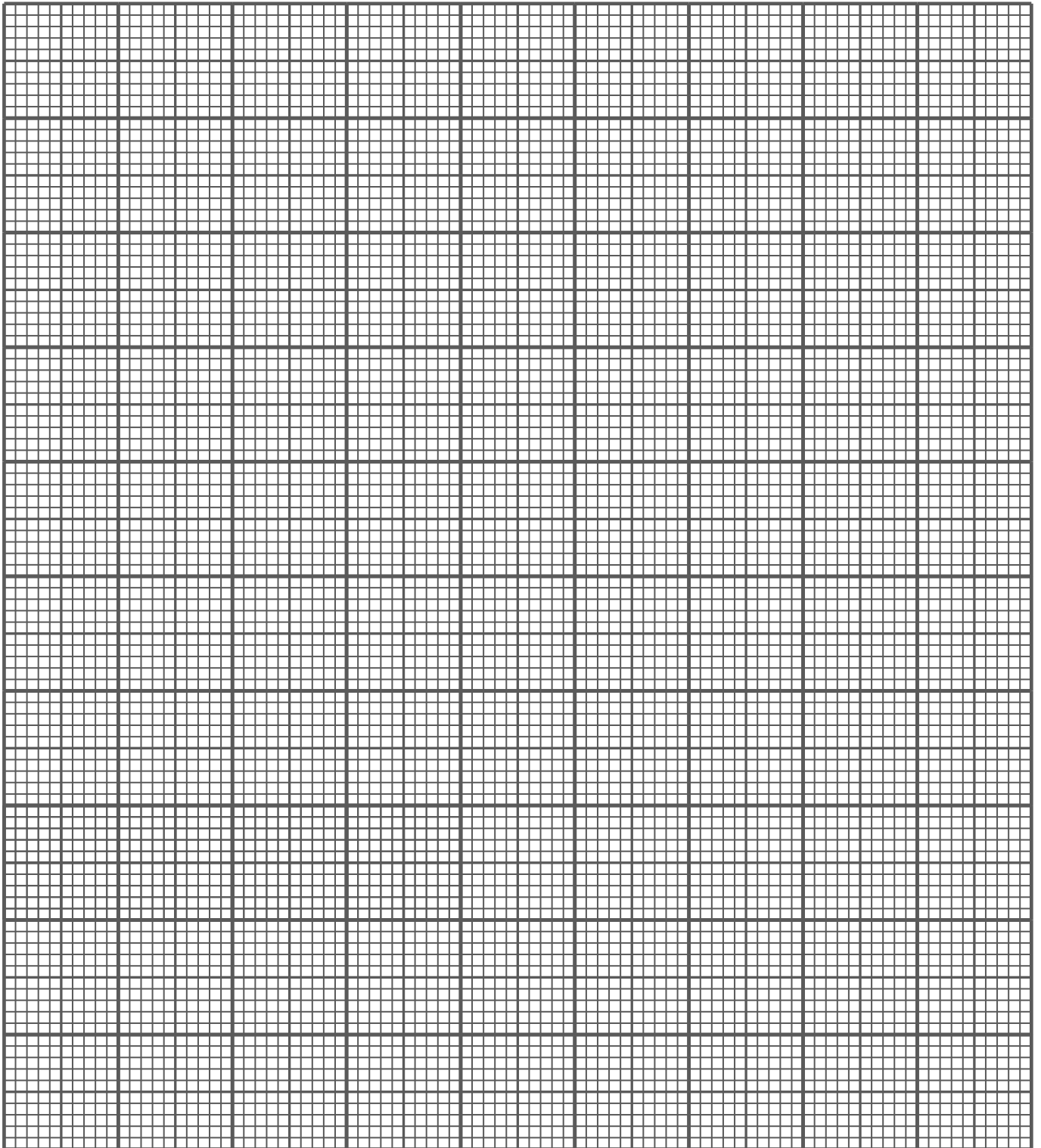
- c) **Use your graph** to find the total hire charge for 135 km travelled.

Ans: € _____

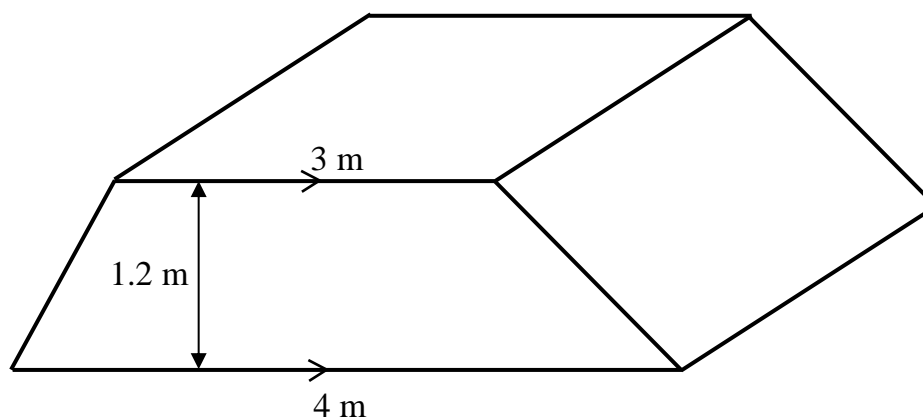
- d) Show that the value of the gradient of this line is 0.4.

- e) The company Smith & Son charges a fixed charge of €10 plus a further €0.45 per kilometre travelled. Without drawing another line, state whether this line would be parallel to that for Jones Bros. Explain your answer.

(11 marks)



13. The diagram shows a **prism**. Its cross-section is a **trapezium**. The top face is a **square**.



- a) Work out, giving your answer correct to **1 decimal place**:

- i) The **area** of cross section

Ans: _____m²

- ii) The **volume** of the prism.

Ans: _____m³

The prism is to be filled with concrete to form the base of a statue. Concrete fills the prism at a rate of 2 litres per second.

- b) How long, in **hours** and **minutes**, will it take to completely fill the prism with concrete?

Ans: _____hour(s) _____minutes
(6 marks)

END OF EXAM PAPER