

KULLEĠĠ SAN BENEDITTU
Boys Secondary School, Kirkop

A

HALF-YEARLY EXAMINATIONS – FEBRUARY 2012

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																					

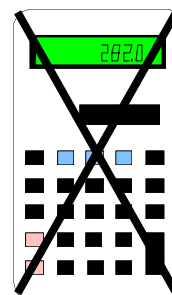
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NAME AND SURNAME: _____ **CLASS:** _____

INSTRUCTIONS TO CANDIDATES:

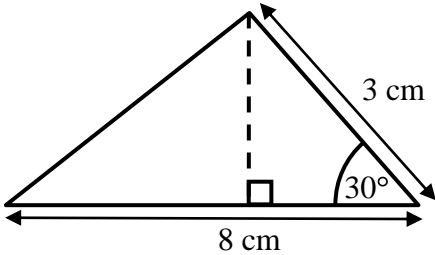
Read all the questions carefully before you start answering.

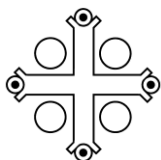
- Answer all questions.
- This paper carries 20 marks.
- **Calculators, protractors** and other mathematical instruments are **NOT ALLOWED**.
- On your desk you should have nothing except for **pen, pencil, ruler** and the **examination paper**.
- You are not required to show your working. However, space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



No.	Question	Space for Working
1	Evaluate: $4^2 + 4^0 + 4^{-1}$ _____	
2	Find the next two terms of the following sequence: 1, 1, 2, 3, 5, 8, 13, 21, _____, _____	
3	Express the number 175 as a product of prime factors . _____	
4	Work out, giving your answer in standard form: $(2.1 \times 10^{-4}) \times (4 \times 10^6)$ _____	
5	Evaluate: $95^2 - 85^2$ _____	
6	Solve: $2(5 + 2x) = 18$ $x =$ _____	
7	Find the median of: 9, 2, 7, 4, 1, 6 _____	
8	Increase €200 by 23% € _____	

9	Write 2.5×10^{-1} as a simplified fraction _____	
10	The average of four numbers is 10. Three of these numbers are 6, 14 and 8. Find the other number. _____	
11	Find the base of a parallelogram which has a perpendicular height of 15 mm and an area of 90 mm^2 . _____ mm	
12	Find x : $3^x = 9 \times 27$ $x =$ _____	
13	Expand and simplify: $(2x - 1)^2$ _____	
14	Given that $a = b^2 - c$, find a when $b = -1$ and $c = -10$ $a =$ _____	
15	Find the length , in cm , of the side of a cube which has a volume of 1 litre. _____ cm	

16	<p>Simplify:</p> $\frac{12xy^3}{6x^2y^3}$ <p>_____</p>	
17	<p>Solve:</p> $3^{x+3} = \frac{1}{9}$ <p>$x =$ _____</p>	
18	<p>Underline the equation which gives a straight line graph parallel to that of $y = 2x - 1$.</p> <p>A. $y = 4x - 1$ B. $y = 2x + 3$ C. $5y = 2x - 1$ D. $y = 3x + 12$</p>	
19	<p>Simplify:</p> $\frac{xy - yz}{x - z}$ <p>_____</p>	
20	<p>Given that $\sin 30^\circ = 0.5$. Find the height of the following triangle:</p>  <p>_____ cm</p>	



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HALF-YEARLY EXAMINATIONS – FEBRUARY 2012

FORM 4

MATHEMATICS Scheme A

TIME: 1hr 40mins

Main Paper

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	Main	NC	Global Mark
Max. Mark	2	6	5	5	6	6	7	6	7	9	6	7	8	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. Leonard wants to cut out the largest possible identical squares from a piece of paper measuring 168 mm by 196 mm. What is the length of each square?

_____ mm
(2 marks)

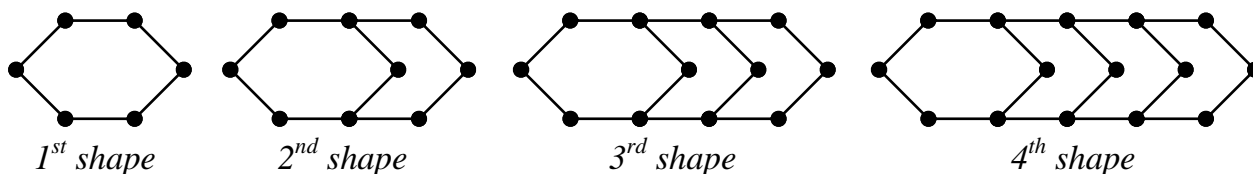
2. (a) Simplify, giving your answer in positive index form:

$$\left(\frac{x^5 y^0}{x^3 y} \right)^{-2}$$

(b) Simplify: $c^4 d \times \sqrt{\frac{c^6 d^{-1}}{c^2 d}}$

(6 marks)

3. The sequence of shapes below is made up of lines that join 2 points:



- (a) Complete the following sequence on the number of lines in the above pattern:

6, 10, _____, _____, _____

- (b) Find the n^{th} term of the sequence found in (a)

n^{th} term = _____

- (c) How many lines will there be in the 20th shape?

_____ lines
(5 marks)

4. In 2009, Mr. Pace invested €8000 at 7.2% p.a. The investment was done at compound interest.

- (a) What is his balance at the end of 2014? Give your answer to the nearest Euro.

€ _____

- (b) For how many **complete** years will the investment have to be left to exceed €10,000?

_____ years
(5 marks)

5. (a) Factorise:

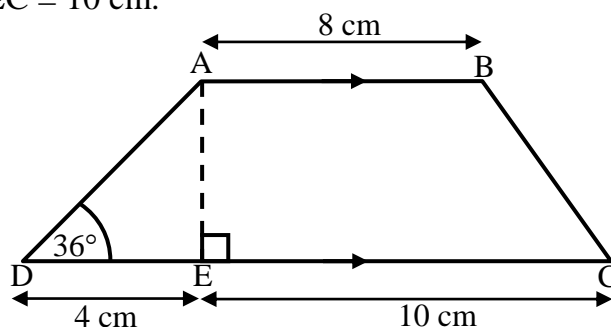
(i) $4b^2 - 25$

(ii) $16b + 4b^2 + 15$

(b) Hence simplify: $\frac{4b^2 - 25}{16b + 4b^2 + 15}$

(6 marks)

6. In the figure below: AB is parallel to DC, $\angle ADC = 36^\circ$, $\angle AEC = 90^\circ$, AB = 8 cm, DE = 4 cm and EC = 10 cm.



*Diagram not
drawn to scale*

Calculate to 2 decimal places:

- (a) the length AE

_____ cm

- (b) the area of the trapezium ABCD

_____ cm²
(6 marks)

7. The heights of 60 students were recorded as shown in the table below.

- (a) Complete the following table.

Height (cm)	Frequency (f)	Mid-values (x)	fx
$130 \leq h < 140$	4		
$140 \leq h < 150$	13		
$150 \leq h < 160$	34		
$160 \leq h < 170$	9		
	Total = 60		Total = _____

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

_____ cm

- (c) Write down the modal height group.

(7 marks)

8. Make x subject of each of the following formulas:

(a) $a = b + cx^2$

(b) $p = x + y(y - x)$

(6 marks)

9. The price of a vintage car increases in price every year. In 2011 its cost is €55,000. Next year its price will increase by 3% and the year after by 3.4%.

(a) Calculate, correct to 1 decimal place, the overall percentage increase of the car from 2011 to 2013.

_____ %

(b) Calculate the price of the car in 2013.

€ _____

(c) From 2010 to 2011 the car increased by 2.5%. Find, to the nearest euro, the price of the car in 2010.

€ _____
(7 marks)

10. (a) Solve: $2x^2 = 9x + 5$

$x =$ _____

(b) Ann is four times as old as her daughter. Let x be her daughter's age.

(i) Fill in the following by writing expressions, in terms of x , for the age of Ann and her daughter, now and in 5 years' time.

Now:

Daughter is _____ x _____ years old

Ann is _____ years old

In 5 years' time:

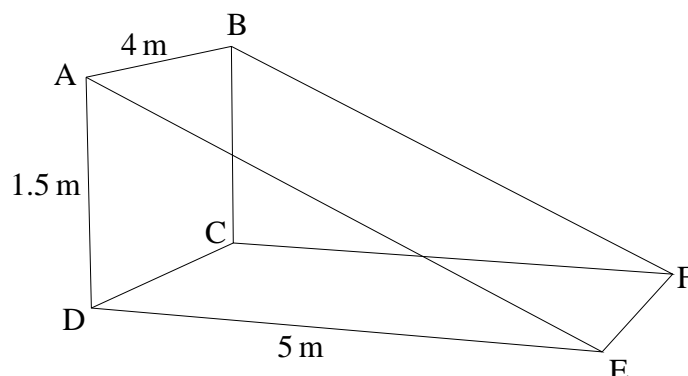
Daughter is _____ years old

Ann is _____ years old

(ii) In five years' time Ann will be three times as old as her daughter.
Write an equation in x and use it to find her daughter's age (x) now.

$x =$ _____
(9 marks)

11. A ramp ABCDEF is constructed out of concrete, where $AB = 4$ metres, $AD = 1.5$ metres, $DE = 5$ metres and $\angle ADE = \angle BCF = 90^\circ$.



*Diagram not
drawn to scale*

Calculate:

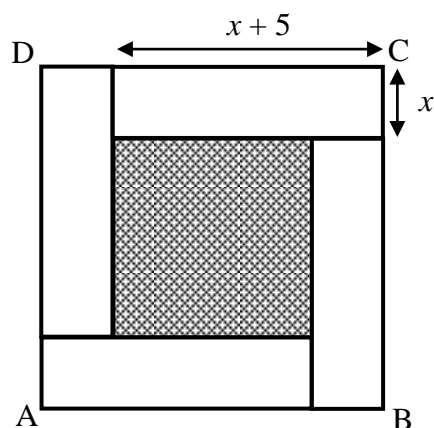
(a) the length AE to 1 decimal place

(b) the volume of the prism ABCDEF

_____ m

_____ m³
(6 marks)

12. Four identical tiles surround the shaded square.



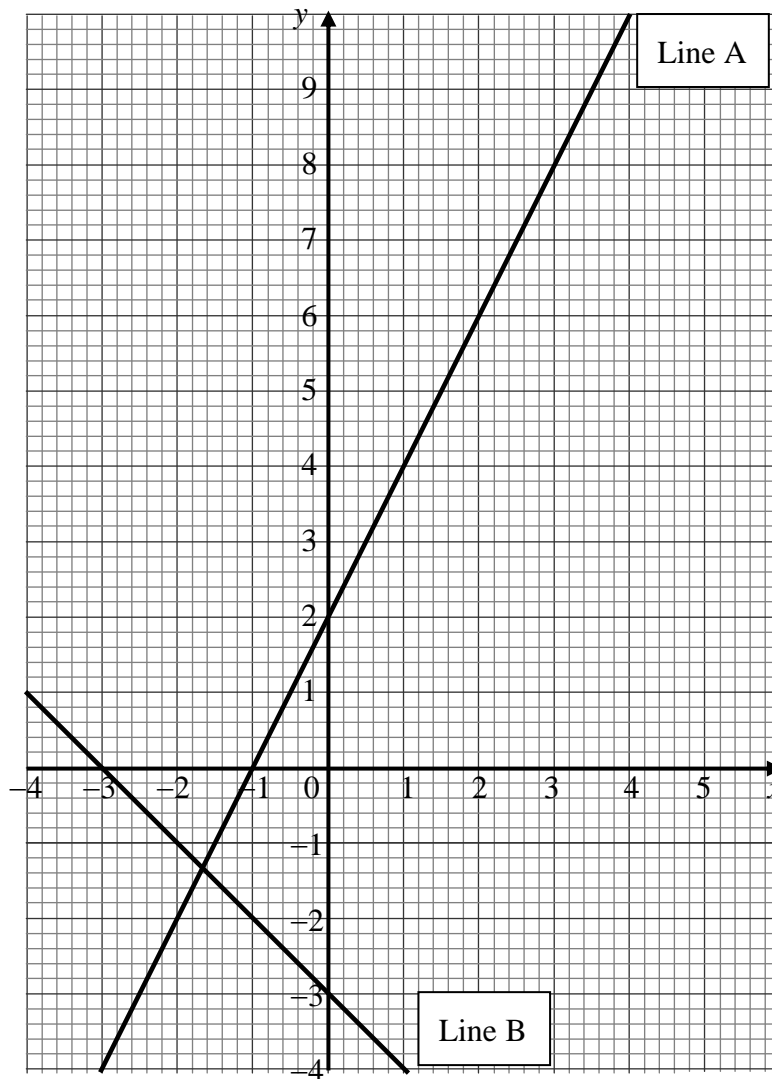
(a) Find and simplify an expression for the sum of the areas of the four tiles.

(b) Find and simplify an expression for the area of the square ABCD.

(c) Hence find the area of the shaded square.

_____ square units
(7 marks)

13. For each of the following straight-line graphs, find:



(a) the gradient

gradient of line A = _____

gradient of line B = _____

(b) the y-intercept

y-intercept of line A = _____

y-intercept of line B = _____

(c) the equation of the line

Equation of line A: _____

Equation of line B: _____

(8 marks)