HALF-YEARLY EXAMINATIONS – FEBRUARY 2014

FORM 3

MATHEMATICS
Levels 7–8

TIME: 30mins

Non Calculator Paper

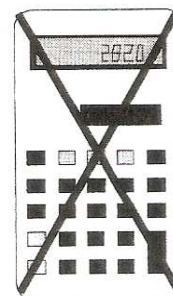| Question	1	2	3	4	5	6	7	8	9	Total
Mark										

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NAME AND SURNAME: _____ CLASS _____

<u>INSTRUCTIONS TO CANDIDATES</u>:

Read all the questions carefully before you start answering.

- Answer all questions.

- This paper carries 25 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.**

1. Thea scored 32 out of 50 possible marks. Write this score as a **percentage**.

Ans:_____%

2. Evaluate:

$$\left(\frac{1}{7} + \frac{3}{14}\right) \times \frac{7}{5}$$

Ans:_____

(3 marks)

3. a) Fill in the following command to draw a **regular polygon**.

PD Repeat _____ [FD 40 RT 30]

b) Find the **perimeter** of this polygon.

Ans:_____

(2 marks)

4. A tank is being filled with water at the rate of 2 cm³ per second. It takes 3 minutes to be filled. How long would it take to fill the same tank if the **rate** is **increased** to 4 cm³ per second?
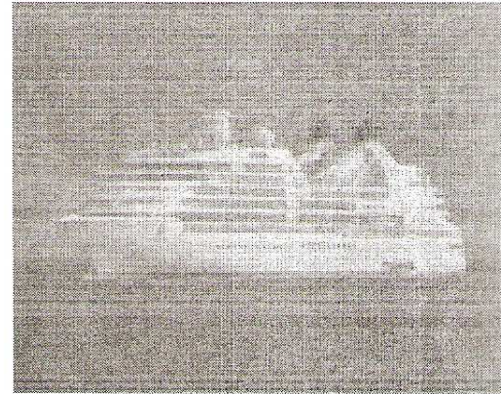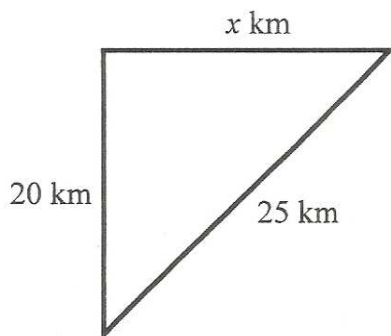
Ans:_____

(3 marks)

5. In this set of 5 numbers, one of them is missing:

$$15, 18, 19, 12, \text{ and } \underline{\hspace{1cm}}.$$

What number could be the missing one such that the **range** of the group is 10?

<div align="right">(2 marks)</div>

6. A ship sails due West for x km and then sails due South for 20 km. It ends up 25 km in a direct straight line from the starting point. Find the value of x.
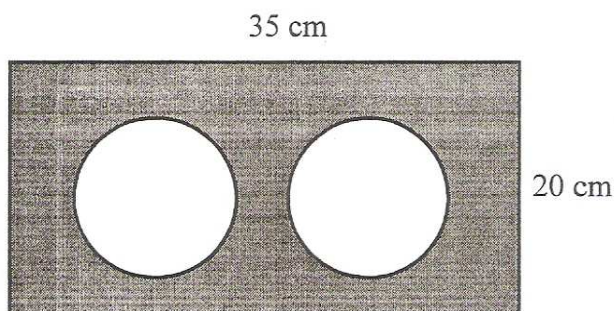
x km

20 km   25 km

Ans:_____

<div align="right">(3 marks)</div>

7. A caterer is baking cheese cakes. She cuts 2 circles of **radius 7 cm** from a piece of rectangular pastry of 35 cm by 20 cm.
Taking $\pi = \frac{22}{7}$, find the **area** which is left uncut (shaded).

35 cm

20 cm

Ans:_____

<div align="right">(4 marks)</div>

8. On Monday Terry reads ¼ of a book. On Tuesday he reads ½ **of the remaining**. What fraction of the book does he still need to read?
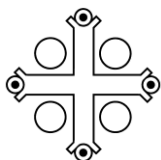
Ans:_____

(4 marks)

9. A manager decides to give €240 to three employees according to how much effort they put in their work. He distributes the money in the ratio 1 : 2 : 3. How much does the employee making the **most** effort get?

Ans:_____

(3 marks)

END OF NON CALCULATOR PAPER

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Boys Secondary School, Kirkop

HALF-YEARLY EXAMINATIONS – FEBRUARY 2014

FORM 3	**MATHEMATICS**	**TIME: 1 h 30mins**
	Track 3	

Main Paper

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Main	NC	Global Mark
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 75 marks.
- Calculators and mathematical instruments are allowed but all necessary working must be shown.

1. A sequence is described by the formula: **3*n* + 2**. Give the values for:

    a) the first term (*n* = 1);

    Ans. a) _____

    b) the fifth term (*n* = 5).

    Ans. b) _____

    (2 marks)

2. a) The radius of the earth is 6.37×10^6 metres. **Write** this distance as an **ordinary number**.

Ans. a) _____

    b) Convert the above answer to **kilometres**.

Ans. b) _____

(2 marks)

3. a) Make w the subject of the formula in $f = \dfrac{3w - r}{2}$

Ans. a) _____

    b) Hence or otherwise, find the **value** of w when $f = 10$ and $r = -5$

Ans. b) _____

(5 marks)

4. A special diet makes you **lose 16%** of your body weight in **3 months**.

   a) Pat weighs 90 kg. How much weight does she **lose** if she goes on this special diet for 3 months?
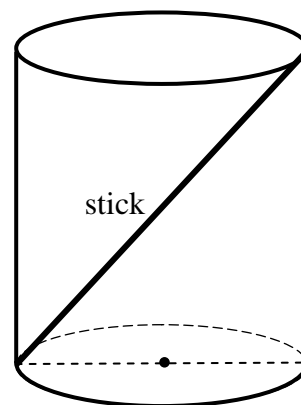
   Ans. a) _____ kg

   b) Tilly weighs 67.2 kg **after losing** 16% of her body weight with this special diet. Work out how much she weighed at the **start** of her diet.

   Ans. b) _____ kg
   (5 marks)

5. A tin is in the form of a cylinder of radius 12 cm and height 22 cm. Leonardo drops a stick in the tin, such that it forms the **diagonal** of the cylinder. A **right angled triangle** also forms.

   a) On this diagram write down the measurements for the **height** and **width** of the cylinder. Also mark the **90° angle** of the right angled triangle.

   stick

   b) Work out the **length** of the stick, correct to the nearest centimetre.

   Ans. b) _____ cm
   (4 marks)

6. Inscribe a **regular pentagon** (5 sides) in a circle of radius 4 cm.

(4 marks)

7. In the following equation, use the method of **trial and improvement** and find x correct to **1 decimal place.**

$$x^3 + 0.5x = 14$$

Ans. $x =$ _____

(4 marks)

8. The following are two brands of sausages.

| Steve's Sausages 74% beef | Bertie's Bangers 48g beef out of every 60g |

   a) Express both quantities as a **ratio** in the form $1 : n$. Give n correct to **2 decimal places** where necessary.

   | Ratio of Steve's Sausages | Ratio of Bertie's Bangers |

   Ans. 1: _____   Ans. 1: _____

   b) Rob wants to buy sausages which contain more beef. By comparing your answers in (a), which sausages should he buy? Explain why.

   _____

   _____

                                                                      (7 marks)

9. Michael and Tanya both think of the same number.
   Michael multiplies the number by 4, and then adds 2.
   Tanya adds 4 to the number, and then multiplies the answer by 2.

   They both end up with the **same** answer.

   a) Let the unknown number be x and use this information to form an equation.

                                                          Ans. a) _____

   b) **Solve** your equation to find the number they both thought of.

                                                          Ans. b) $x =$ _____

                                                                      (5 marks)

10. The following spreadsheet is used in investments.

	A	B	C	D
1	**Principal (€)**	**Time (in yrs)**	**Rate (% p.a.)**	**Interest (€)**
2	500	2	4	
3		9	4	108

a) Write down the **formula** to be typed in cell D2 to obtain the interest for the investment in row 2.

Ans. a) _____

b) Write down the **formula** to be typed in cell A3 to obtain the principal for the investment in row 3.
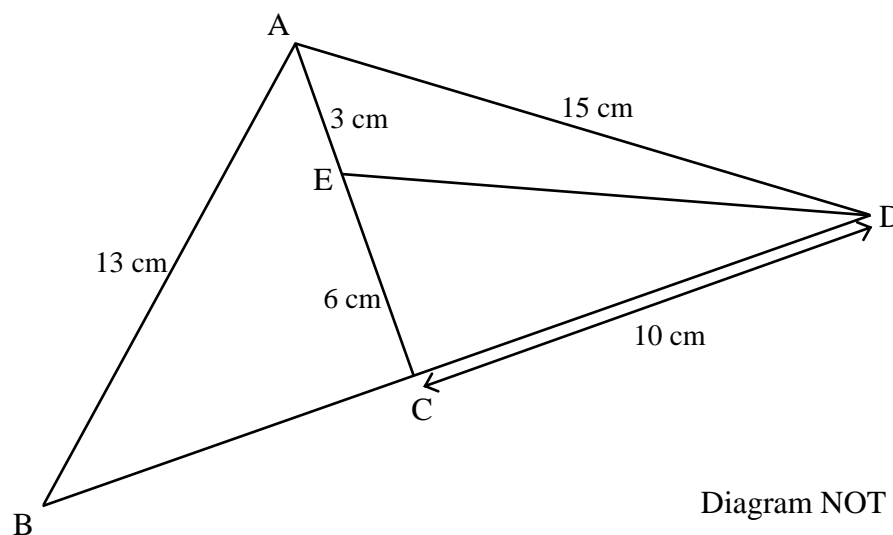
Ans. b) _____

c) Fill in cells D2 and A3 with the correct **values**. Show your working below.

Ans. c) D2 = _____

A3 = _____

(8 marks)

11. *In this question, you may use some or all of the measurements in the diagram.*
 Is angle ACD a right angle? Show your working.

A

3 cm

15 cm

E

D

13 cm

6 cm

10 cm

C

B

Diagram NOT to scale

Ans. _____

(4 marks)

12. a) Factorise fully: $18a + 30b$

Ans. a) _____

b) Simplify: $\dfrac{6z+9}{3}$

Ans. b) _____

c) Expand and simplify: $(x + 4)(x - 3)$

Ans. c) _____

d) Evaluate: $\dfrac{2^5 \times 2^3}{2}$

Ans. d) _____

(9 marks)

13. Terri conducts a survey.
    She finds out how many hours of TV students watched last Monday.
    The frequency table shows her results.

Number of hours TV	Frequency
0	2
1	7
2	9
3	4
4	3
5	0

a) How many students took part in Terri's survey?

Ans. a) _____ students

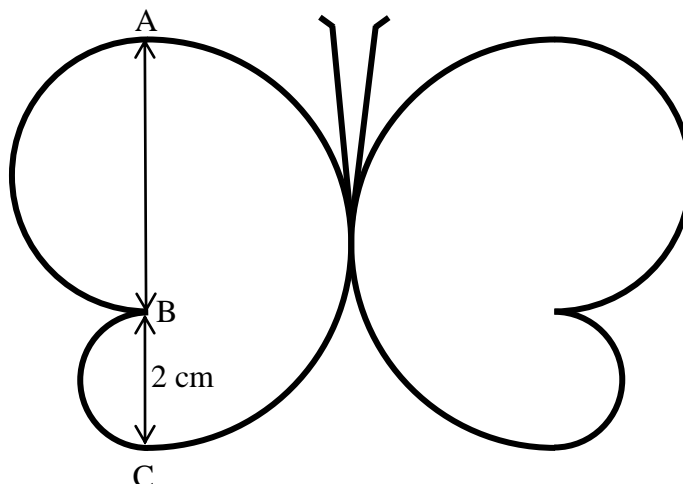b) What is the **mode** number of hours of TV watched?

Ans. b) _____ hours

c) Work out the **mean** number of hours of TV watched.

Ans. c) _____ hours

(5 marks)

14.   The following is a symmetrical butterfly shape made of thin wire. Each of the antennas is 6 cm long. The wings of the butterfly each consist of 3 semicircles of different sizes, where lengths AB, BC and AC represent their diameters.

a)   Find the **length of semicircle** BC. Give your answer in terms of π.

Ans. a) _____ cm

b)   Given that AB = 2r cm. Write, in terms of π, an expression for the length of
   i)   semicircle AB;

Ans. b) i) _____ cm

   ii)   semicircle AC.

Ans. b) ii) _____ cm

b)   Given that the perimeter of one wing of the butterfly is 7π cm, find the value of r.

Ans. c) r = _____

d)   Find the **cost** involved in buying enough thin wire to make this butterfly if the wire is sold at €1 for every 10 cm required.

Ans. d) €_____

(11 marks)

END OF EXAM