JUNIOR LYCEUM ANNUAL EXAMINATIONS 2004
Educational Assessment Unit — Education Division

FORM 4 **MATHEMATICS (Non Calculator Paper)** **Time: 20 min**

Name: _____ Class: _____

Mark

Instructions to Candidates

- **Answer all questions. There are 20 questions to answer.**

- **Each question carries 1 mark.**

- **On your desk you should have nothing except for pen, pencil and examination paper.**

- **To answer questions involving numerical calculations you are advised to choose and use the more efficient techniques (mental or paper-and-pencil).**

- **You are not required to show your working. However space for working is provided if you need it.**

No.	Question	Space for Working
1	The **product** of 24 and 3 is: **A.** 72 **B.** 27 **C.** 21 **D.** 8 **Answer:** _____	
2	Write **a prime number** between 30 and 40. **Answer:** _____	
3	**Write in figures**: twenty thousand and two. **Answer:** _____	
4	**Estimate**: $\dfrac{1002 \times 42}{78 \times 51}$ **Answer:** _____	
5	Give an **estimate** for the **square root** of **35**. **Answer:** _____	
6	$9 + 9 + 9 + 9 + 9$ is **not equal** to: **A.** 45 **B.** 9×5 **C.** 5×9 **D.** 9^5 **Answer:** _____	
7	If $x^3 = 125$, what is the value of x? **Answer:** _____	
8	**Evaluate:** $1000^{1/3}$ **Answer:** _____	

9	Which is the **largest number**? **A.** 2.75×10^2 **C.** 0.275×10^2 **B.** 2.75×10^{-2} **D.** 27.5×10^2 **Answer:** _____	
10	Work out the **simple interest** on Lm1000 after two years at 5.5% per annum. **Answer:** Lm _____	
11	What is the **difference** between $\frac{3}{5}$ and $\frac{1}{2}$? **Answer:** _____	
12	If $\sqrt{625} = 25$, what is the value of $\sqrt{6.25}$? **Answer:** _____	
13	If $634 \times 25 = 15850$, what is the value of 63.4×2.5? **Answer:** _____	
14	A team can win, draw or lose a match. The probability of winning is ½ and the probability of drawing is 0.3. What is the **probability** of **losing** a match? **Answer:** _____	
15	I think of a number, double it and subtract 5. The answer is 21. What **number** did I think of? **Answer:** _____	

16	A river is 500 metres wide. On a map the river is 1 cm wide. What is the **map ratio**? **Answer:** 1**:** _____	
17	A newspaper headline stated: **26 000 WATCH RANGERS WIN** This number is given to the **nearest thousand**. What was the **least number** of spectators that could have been present? **Answer:** _____	
18	Triangle PQR is isosceles. Write down the value of **tan R**. **Answer:** _____	
19	When I change Lm100 into euro I get 250 euro. How many will I get for **Lm20**? **Answer:** _____	
20	A circle is drawn so that the vertices of triangle ABC lie on its circumference. What is the **length** of the **diameter** of the circle? **Answer:** _____	

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FORM 4   **MATHEMATICS (MAIN)**   **Time: 1 hour 40 min**

1	2	3	4	5	6	7	8	9	10	11	12	13	NC	Main	Total

Name: _____   **Class: _____**

> **Calculators are allowed but the necessary working must be shown.**
> **Answer all questions.**

1.   Write down the **next number**.

4, 2, 1, ½, ¼, …

giving your answer
(i)   as a **fraction**,
(ii)   in **standard form**.

Answer: (i) _____ (ii) _____

(2 marks)

2.   Find the **value of** x:
        (i) $2^x = 16$ (ii) $2^x = 1$ (iii) $2^x = ¼$

Answer: (i) _____ (ii) _____ (iii) _____

(3 marks)

3.   (a)   Find the value of a given that:
                $(x-5)^2 = x^2 - ax + 25$

        (b)   Make a the **subject of the formula** given that $c = \sqrt{a-b}$.

Answer: _____   **Answer**:_____

(4 marks)

4.   The following LOGO statement draws a regular polygon.

PD FD 80 RT 120 FD 80 RT 120 FD 80 RT 120

(i)   Draw a **sketch** of this polygon.

(ii)   The following procedure draws **the same polygon**.
        Complete the procedure.

```
TO POLYGON
   PD
   REPEAT _____ [FD _____ RT _____ ]
END
```

(5 marks)

5.   Dominic used a spreadsheet to change Maltese Liri to euro (Figure 1). The
exchange rate was Lm1 = 2.35 euro. He wanted to change Lm375 into euro.
(i)   What **formula** did Dominic type in cell C2?
(ii)   What **amount** did he get in cell C2 when he pressed the **ENTER** button?
Dominic changed the amount in cell A2 and he got 1198.5 euro in cell C2.
(iii)   What was the value Dominic typed in cell A2?

	A	B	C
1	Maltese Liri	Exchange Rate	Euro
2	375	2.35	

Figure 1

Answer: (i) _____ (ii) _____ (iii) _____

(6 marks)

6. In the year 2000 the value of a house was Lm75 000. In the year 2001 the value had **increased** to Lm81 750.
   (i) Work out the **percentage increase**.
   (ii) The value of the house continues to rise **at the same rate**. What was its value in 2002?

   Answer: (i) _____ (ii) _____
   (6 marks)

7. In Figure 2 PTR is a tangent to a circle, centre O. PO is parallel to BT.
   (i) Write down the size of **angle ABT** and **angle BTR**.
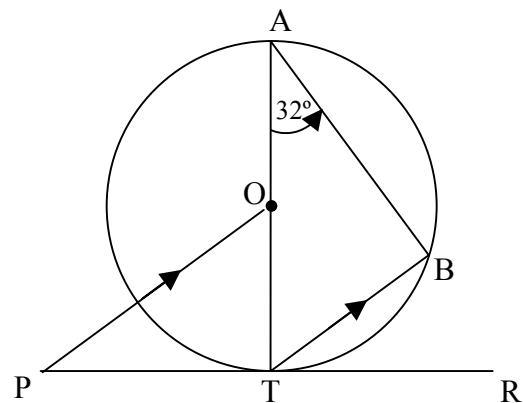   (ii) **Prove** that triangles OPT and ABT are **similar**.

Figure 2

   Answer: (i) /ABT = _____ /BTR = _____
   (6 marks)

8. A right-circular cone is formed from a rectangular piece of wood measuring 10 cm by 10 cm by 12 cm (Figure 3). The diameter of the cone is 10 cm and its height is 12 cm. Work out, **correct to 3 significant** figures:
    (i)   the **volume** of the **cone**,
    (ii) the **volume** of the **wood** that is **wasted**.
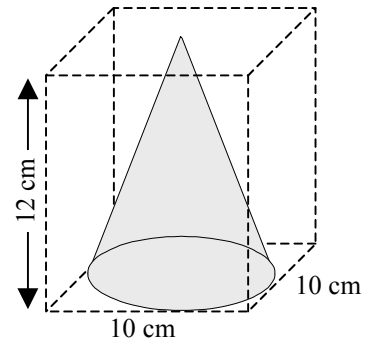   (Volume of cone = $\frac{1}{3}\pi r^2 h$)

Figure 3

12 cm

10 cm

10 cm

Answer: (i) _____ (ii) _____

(6 marks)

9. ABCDEFGH is a regular octagon having centre O (Figure 4).
    (i)   Write down the **image of triangle AOB** after a clockwise rotation of 90º about O.
    Describe the transformation that will transform triangle AOB into
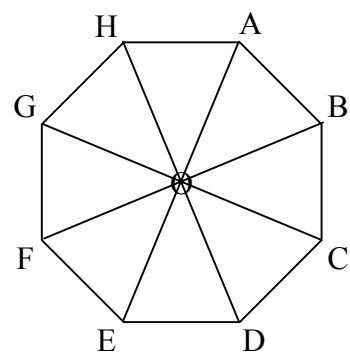   (ii) triangle GOH
    (iii) triangle GOF

Figure 4

Answer: (i) _____

(ii) _____

(iii) _____

(7 marks)

10. Figure 5 shows a circle divided into eight equal sectors which are numbered as shown. A pointer is fixed to the centre and is free to spin. A trial consists of spinning the pointer and noting the number on which the pointer stops.
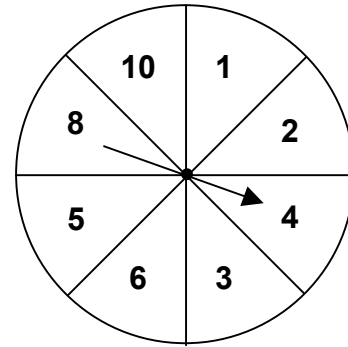
Work out the **probability** of getting

(i) a **5 or a 3**

(ii) an **even number**

The pointer is spun twice and the two numbers noted.

Work out the **probability** that the two numbers

(iii) are **both even**

(iv) **add up to 15**.

Figure 5

Answer: (i) _____ (ii) _____ (iii) _____ (iv) _____

(8 marks)

11. PQ is a chord of a circle with centre O (Figure 6). The length of the radius OP is 25 cm and the length of PQ is 40 cm. Work out, **correct to 3 significant figures**
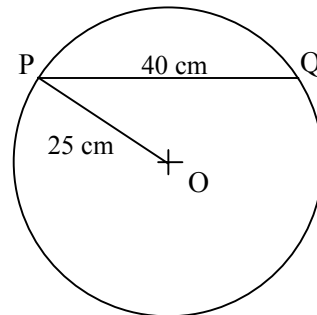
(i) the **distance** of **PQ** from the **centre**,

(ii) the size of the **obtuse angle POQ**,

(iii) the **area of sector POQ**.

Figure 6

Answer: (i) _____ (ii) _____ (iii) _____

(8 marks)

12. (a) **Simplify**: $\dfrac{8}{x+7} - \dfrac{3}{x-4}$

(b) Use the formula

$$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

to solve the equation $5x^2 = 3x + 1$.

Answer: (a) _____ (b) _____

(8 marks)

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13. The perimeter of a rectangle is 12 cm and the length of one of the sides is x cm.
   (i) Write an **expression** for the width of the rectangle.

   (ii) **Show** that the area, A, of this rectangle is given by $A = 6x - x^2$.
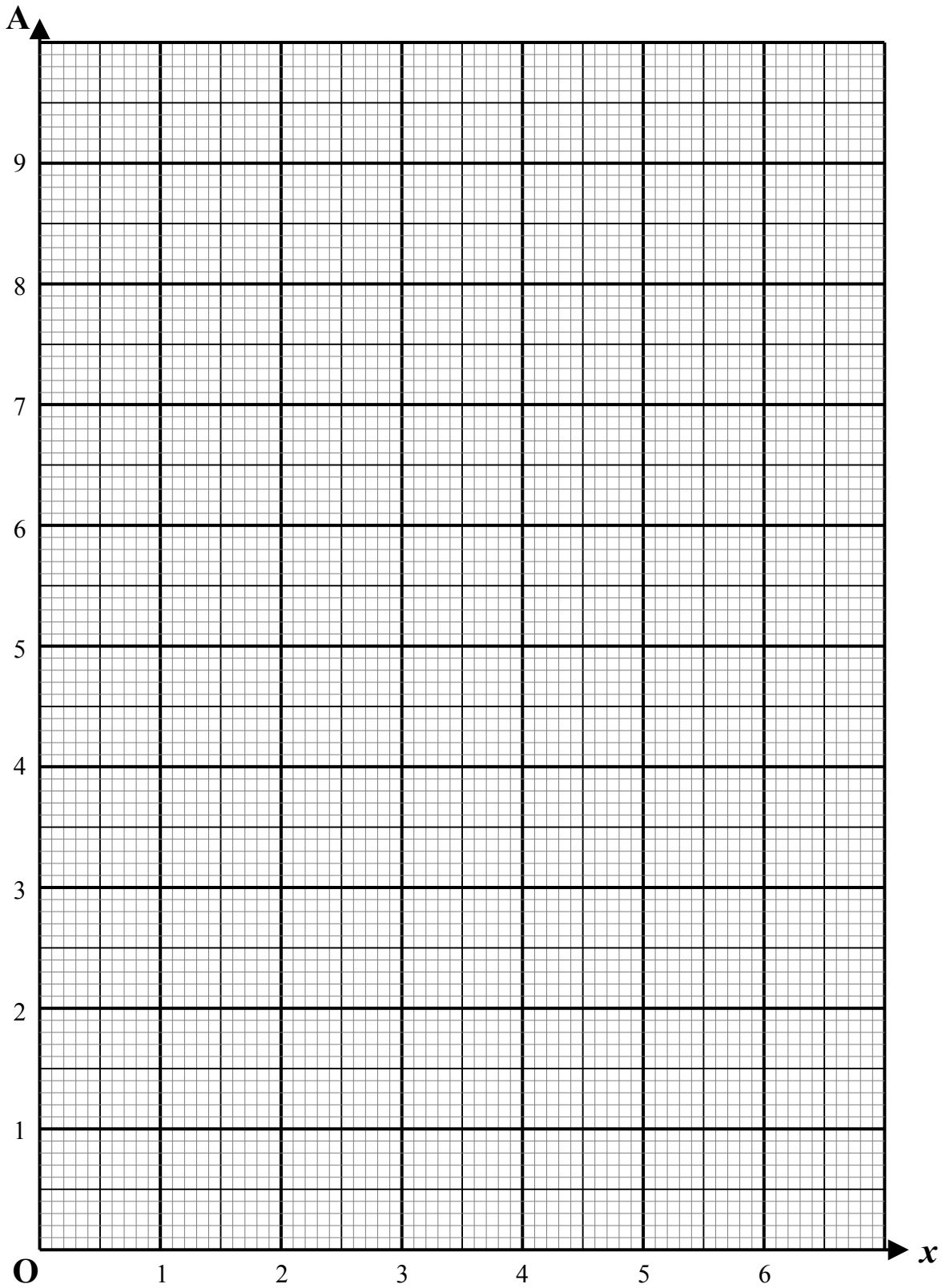
   Complete the following table that shows the area of the rectangle for values of x from 0 to 6.

x	0	1	2	3	4	5	6
$6x$	0	6	12		24	30	36
$-x^2$	0	−1	−4		−16	−25	−36
A	0		8		8	5	0

   On the grid that follows draw the graph of $A = 6x - x^2$. Use your graph to estimate
   (iii) the **area of the rectangle** when the length is 2.5 cm,
   (iv) the **maximum area** of the rectangle.

A

x

O   1   2   3   4   5   6

(11 marks)