

JUNIOR LYCEUM ANNUAL EXAMINATIONS – 2004

Educational Assessment Unit – Education Division.

FORM 5

MATHEMATICS (Non Calculator Paper)

TIME: 20 min.

Name _____

Class _____

Mark

ANSWER ALL QUESTIONS. THERE ARE 20 QUESTIONS TO ANSWER.

EACH QUESTION CARRIES 1 MARK.

CALCULATORS, RULERS, PROTRACTORS AND OTHER MATHEMATICAL INSTRUMENTS ARE NOT ALLOWED.

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 PENCIL-AND-PAPER).

YOU ARE NOT REQUIRED TO SHOW YOUR WORKING. HOWEVER SPACE FOR WORKING IS PROVIDED IF YOU NEED IT.

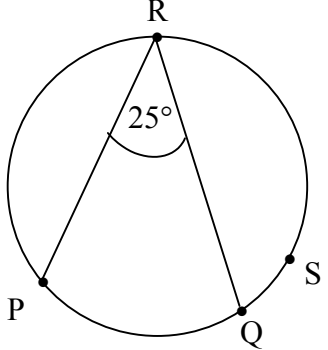
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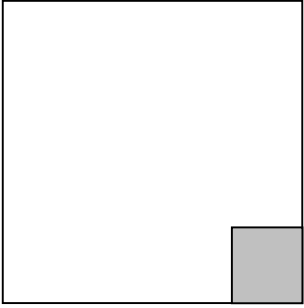
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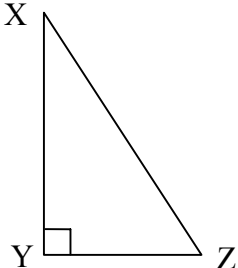
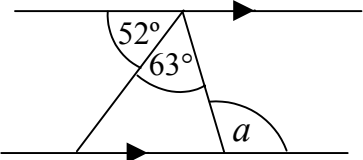
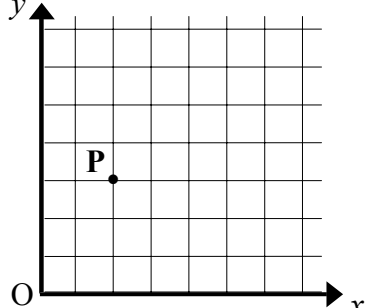
IN

THIS

SPACE

No.	QUESTION	SPACE FOR WORKING (IF REQUIRED)
1.	How many 50 cent coins make Lm10? Ans: _____	
2.	$\sqrt{82}$ is approximately: A) 10 B) 9 C) 8 D) 7. Ans: _____	
3.	Complete this geometrical fact. ‘Two tangents drawn to a circle from the same point outside the circle are in length.’ Ans: _____	
4.	$2^3 + 2^2$ is equal to: A) 2^5 B) 4^5 C) 12 D) 32. Ans: _____	
5.	Lm1 is equivalent to €2.428. Change Lm1500 to euro. Ans: _____	
6.	Simplify $2\frac{4}{5} + 3\frac{1}{3} - \frac{4}{5} - 1\frac{1}{3}$ Ans: _____	
7.	<div style="display: flex; align-items: flex-start;"> <div style="flex: 1;">  </div> <div style="flex: 2; padding-left: 20px;"> <p>The marked angle PRQ measures 25°. When point Q is dragged to a new position S:</p> <p>A) $\angle PRS$ will be smaller than $\angle PRQ$.</p> <p>B) $\angle PRS$ will be bigger than $\angle PRQ$.</p> <p>C) $\angle PRS$ remains equal to $\angle PRQ$.</p> </div> </div> <p style="text-align: right; margin-top: 20px;">Ans: _____</p>	

No.	QUESTION	SPACE FOR WORKING (IF REQUIRED)
8.	<p>The turtle is given the following LOGO commands.</p> <p style="text-align: center;">PD FD 120 BK 120 RT 90 FD 60 HOME</p> <p>The turtle starts at the position shown. Make a sketch of what the turtle draws to satisfy these LOGO commands.</p>	
9.	<p>This question refers to a spreadsheet.</p> <p>Cell A1 contains the value 5. Cell A2 contains the value 4. Cell A3 contains a formula that reads $= (A1+A2)^2$. What value would you expect in cell A3? Ans: _____</p>	
10.	<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>The diagram shows a big square of side 4 cm and a small shaded square of side 1 cm. What fraction of the big square is shaded?</p> <p style="text-align: right;">Ans: _____</p> </div> </div>	
11.	<p>$\frac{1}{9}$ is equivalent to:</p> <p>A) 9^1 B) 1^{-9} C) 3^2 D) 3^{-2}</p> <p style="text-align: right;">Ans: _____</p>	
12.	<p>The vertices of a regular hexagon lie on the circumference of a circle. The angle subtended at the centre of the circle by one side of the hexagon is equal to:</p> <p>A) 30° B) 45° C) 60° D) 90°.</p> <p style="text-align: right;">Ans: _____</p>	
13.	<p>6 apples and 4 bananas cost 72 cents. 5 apples and 3 bananas cost 58 cents. What is the total cost of an apple and a banana?</p> <p style="text-align: right;">Ans: _____</p>	

No.	QUESTION	SPACE FOR WORKING (IF REQUIRED)
14.	Given that $f(x) = 2x^2$, find $f(3)$. Ans: _____	
15.	The side of a square is of length 9 cm. A rectangle having one side of length 10 cm is equal in area to the square. Find the length of the other side of the rectangle. Ans: _____	
16.	<div style="display: flex; align-items: center;">  <p>A circle passes through the vertices of triangle XYZ. The centre of this circle is: A) inside the triangle. B) at the midpoint of side XZ. C) somewhere outside the triangle XYZ. D) at the midpoint of side XY.</p> </div>	Ans: _____
17.	A quadrilateral has all its sides equal . Its diagonals are not equal . This type of quadrilateral is called: A) rectangle B) parallelogram C) rhombus D) square. Ans: _____	
18.	<div style="display: flex; align-items: center;">  <p>What is the size of angle a ? Ans: _____</p> </div>	
19.	The graphs $y = 2x - 4$ and $y = 2x + 5$ are drawn using the same axes and scales. What is the distance between the points where the graphs cut the y -axis? Ans: _____ units	
20.	The coordinates of point P are (2,3). Point P is translated to point Q by the vector $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$. The coordinates of point Q are: A) (4,6) B) (4,0) C) (5,5) D) (5,1). Ans: _____	

JUNIOR LYCEUM ANNUAL EXAMINATIONS 2004

Educational Assessment Unit - Education Division

FORM 5

MATHEMATICS (Main Paper)

TIME: 1 h 40 min

Question	1	2	3	4	5	6	7	8	9	10	11	12	Total Main	Non Calculator	Global Mark
Mark															

DO NOT WRITE ABOVE THIS LINE

Name _____

Class _____

**CALCULATORS ARE ALLOWED
BUT ALL NECESSARY WORKING MUST BE SHOWN
ANSWER ALL QUESTIONS**

1. $p = 2.83 \times 10^{-2}$ and $q = 5.8 \times 10^{-3}$

Work out the **sum** of p and q . Give the answer in standard form.

_____ (4 marks)

2. Fiona invested €6400 in a bank at 5.5% per annum.

a) How much interest (in euro) did she receive after **one year**?

b) **Lm1 is equivalent to €2.428.** Change the **interest** that she received to Maltese Liri.
Give the answer correct to the nearest cent.

_____ (4 marks)

3. The sum of the **interior** angles of a polygon is 1080° .
Work out the number of sides of this polygon.

(4 marks)

4. a) The diagram shows part of a spreadsheet.

	A	B	C
1	75		
2	63		
3	82		
4	70		
5	95		
6			

Column **A** shows the marks that Patrick obtained in five Mathematics tests. Underline the formula that you would use in cell **A6** to obtain Patrick's **average** mark for these tests.

$= (A1 + A5) / 5$

$= \text{sum} A1:A5 / 5$

$= \text{sum} (A1:A5) / 5$

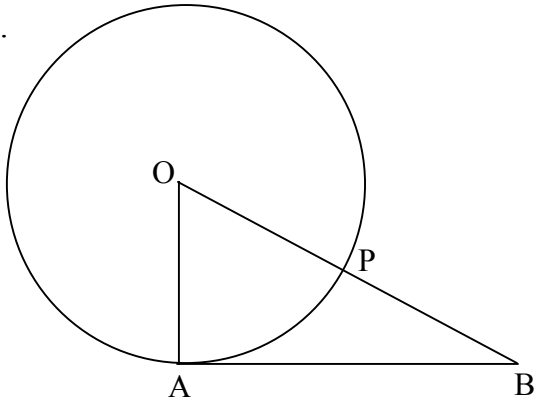
- b) Simon sat for five Mathematics tests. In the first **four** tests the marks he obtained were 82, 70, 75 and 80.
His average mark for the **five** tests was 75. Work out his mark for the fifth test.

(4 marks)

Name _____

Class _____

5.



O is the centre of a circle of radius 8 cm.
 AB is a tangent of length 15 cm touching the circle at A. P is the point of intersection of OB and the circumference of the circle.

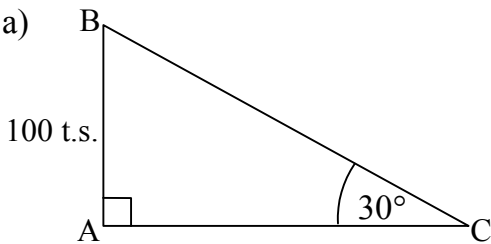
- a) What is the size of angle OAB?
 Give a reason for your answer.

- b) Work out the length of OB.

- c) Write down the **ratio** OP : PB _____

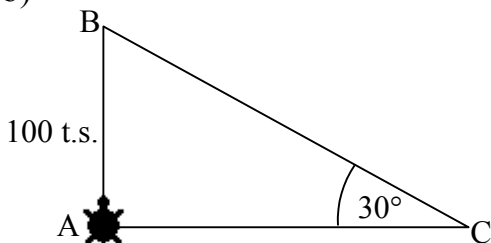
(5 marks)

6. a)



Triangle ABC is right-angled at A.
 AB = 100 turtle steps and $\angle ACB = 30^\circ$.
 Work out the length of BC, giving the answer in turtle steps.

b)



Complete this set of LOGO commands given to the turtle to draw the right-angled triangle ABC. The turtle started at point A as shown.

PD FD 100 RT _____ FD _____ HOME

(5 marks)

7. a) Last season GOAL UNITED played 22 matches of which 7 were lost. The rest of the matches were either won or drawn.

Let w be the number of matches won and d the number of matches drawn.

(i) Write down an equation to show this information.

In the same season, a win was awarded 3 points, a draw was awarded 1 point and a loss was awarded no points. GOAL UNITED collected a total of 35 points during the season.

(ii) Write down a second equation to show this information.

(iii) Use the above equations to find the number of matches won and the number of matches drawn by GOAL UNITED.

b) In the same season SOCCER HEROES also played 22 matches. They finished the season with the **same** number of points as GOAL UNITED but won 2 matches less than GOAL UNITED.

(i) How many matches did they draw?

(ii) How many matches did they lose?

(8 marks)

8. $f(x) = 2x + 3$ and $g(x) = x^2$

a) Describe $f(x)$ in words.

b) Work out $f(-5)$

c) Find $f^{-1}(x)$

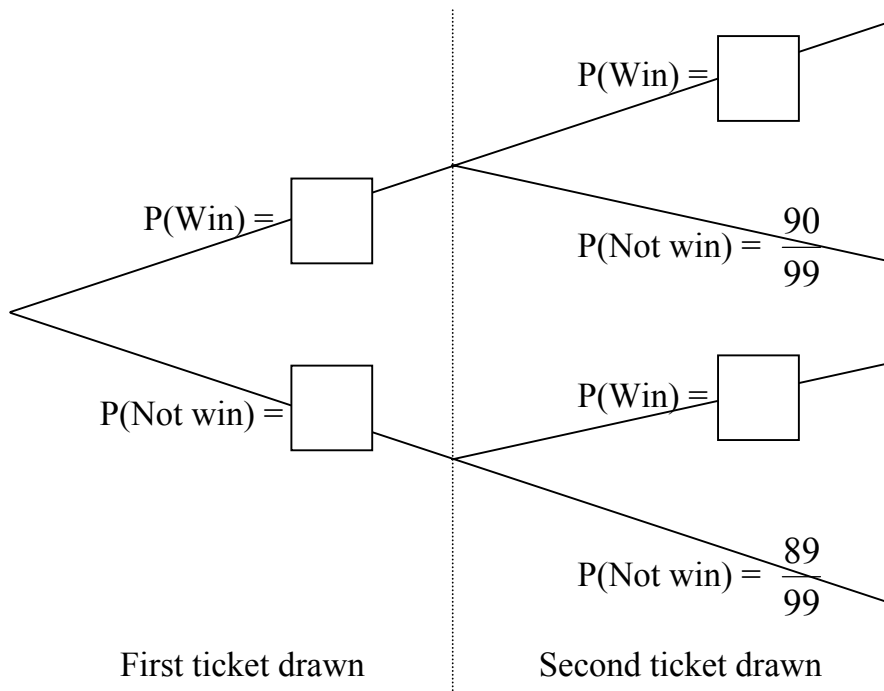
d) Solve $g(x) = f(x)$

(8 marks)

9. Tickets numbered from 1 to 100 are entered for a lottery. A ticket holder having more than one ticket can win more than one prize. Once a ticket is drawn it is **not** replaced. Laura bought ten tickets.

a) A first draw is made to award first prize. Find the probability that Laura wins first prize.

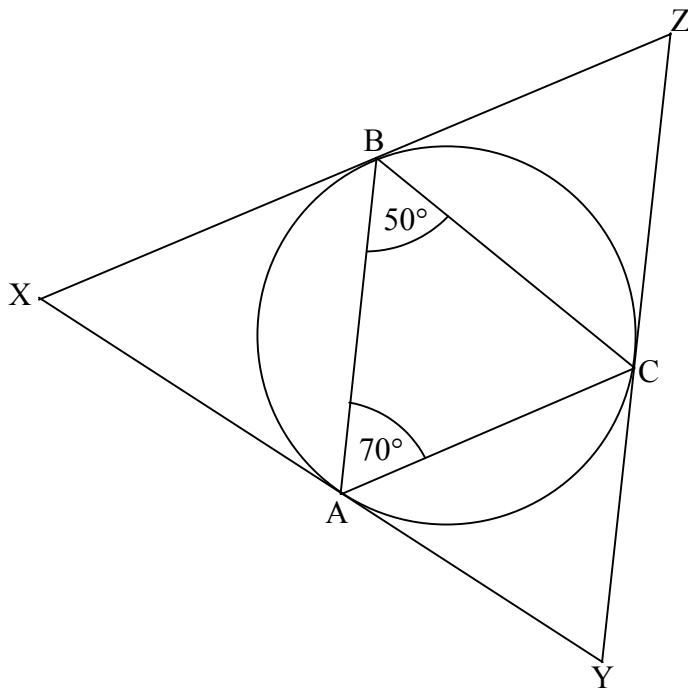
b) A second ticket is drawn to award second prize. Complete the following probability tree for the first two draws. Use the probability tree to find the probability that Laura does not win first prize but wins second prize.



c) A third ticket is drawn. Extend the probability tree, if necessary, to find the probability of Laura **not** winning once after three tickets are drawn. Give your answer correct to two decimal places.

(9 marks)

10. XBZ , XAY and YCZ are tangents to the circle ABC .
Work out the size of the angles of triangle XYZ .
Give reasons for your answers.



(8 marks)

11. Plot the points $A(2,1)$, $B(6,1)$, $C(6,4)$ and $D(2,4)$. Join the points to form rectangle $ABCD$.

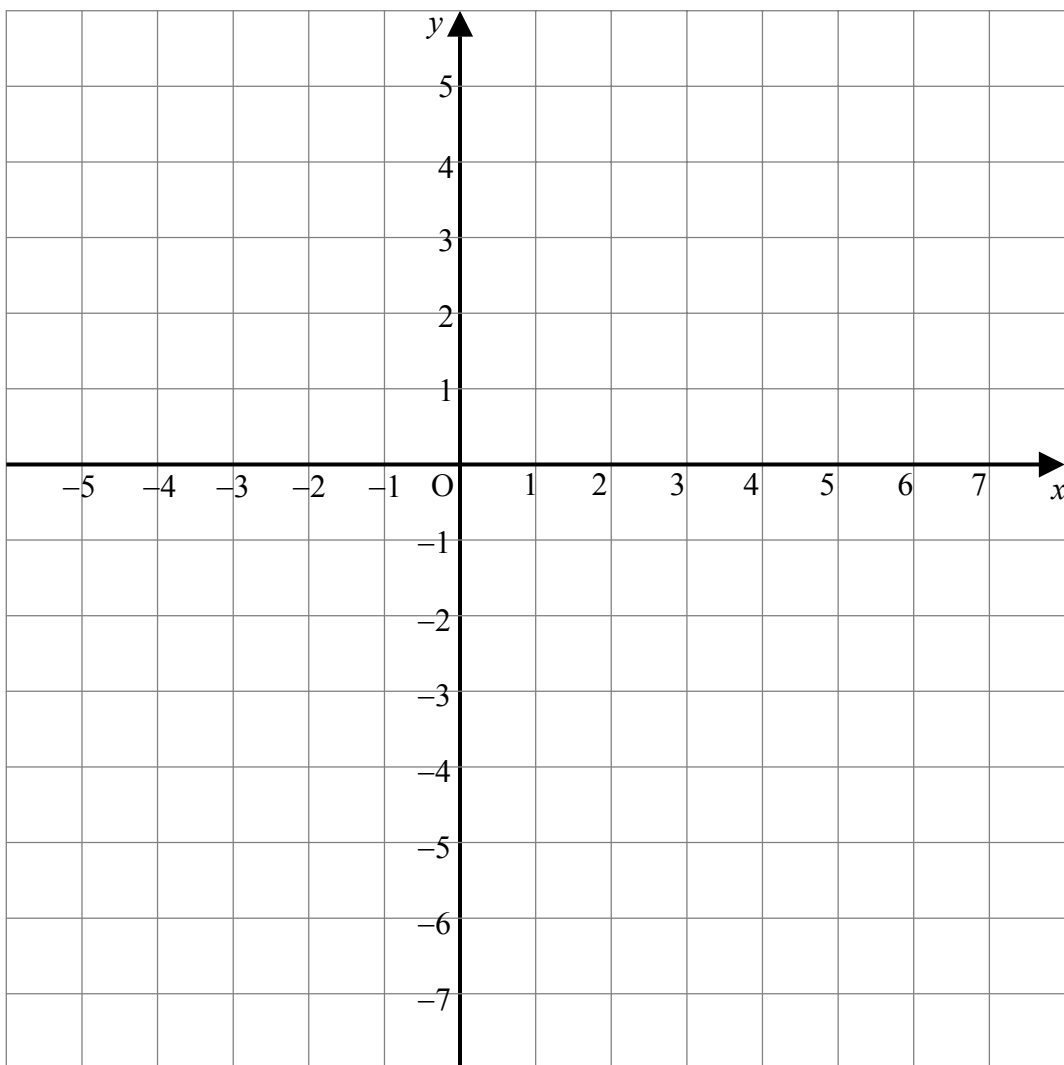
a) **Rotate** $ABCD$ 90° clockwise about O and label the image $A_1B_1C_1D_1$.

b) **Reflect** $A_1B_1C_1D_1$ in the y -axis and label the image $A_2B_2C_2D_2$.

c) Describe the single transformation that maps $ABCD$ to $A_2B_2C_2D_2$.

.....

d) Rectangle $A_3B_3C_3D_3$ is an enlargement, centre O scale factor -6 of rectangle $ABCD$.
Without drawing $A_3B_3C_3D_3$ work out the length of B_3D_3 .



(9 marks)

12. The table gives values of y for certain values of x on the curve with equation $y = x^3 - 16x$.

x	-4	-3	-2.5	-2	-1	0	1	2	2.5	3	4
y	0	21	24.4	24	15	0	-15	-24	-24.4	-21	0

(The values of y for $x = -2.5$ and $x = 2.5$ are rounded to one decimal place).

- a) On the graph paper provided draw the graph of $y = x^3 - 16x$ for $-4 \leq x \leq 4$.
Use a scale of 2 cm for 1 unit for x and 2 cm for 5 units for y .
- b) (i) Draw, using the same axes and scales the graph of $y + 8x = 0$.
- (ii) Write down the x coordinates of the points of intersection of the two graphs, correct to one decimal place, where necessary.
- (iii) Find the equation which has these values as roots. (Show **ALL** your working).
- c) Use the solutions obtained above to find by **trial and improvement** the **positive** solution of $x^3 - 8x = 0$, correct to 2 decimal places. (Show **ALL** your working).

(12 marks)

END OF PAPER