JUNIOR LYCEUM ANNUAL EXAMINATIONS 2005
Educational Assessment Unit — Education Division

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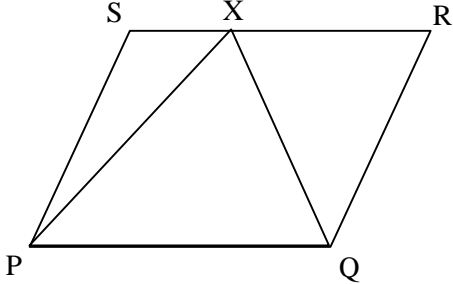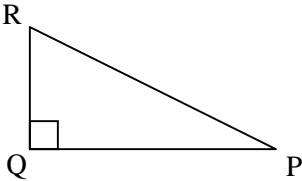
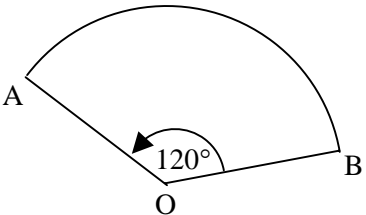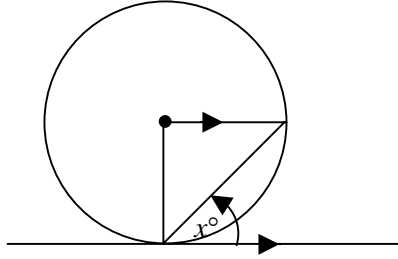**Name:** _____   **Class:** _____

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	**Evaluate**: $0.5 \times 18 \times 7$. **Answer:** _____	
2	A fair coin is tossed three times. What is the probability of getting three heads? **Answer:** _____	
3	Work out: $\sqrt{2\frac{1}{4}}$. **Answer:** _____	
4	A chocolate bar costs 22 cents. What is the **total cost** of 99 chocolate bars? **Answer:** _____	
5	**How many quarters** are there in 5¼? **Answer:** _____	
6	The perimeter of a triangle ABC is 12 cm. AB = 3 cm and BC = 4 cm. What is the **size of angle B**? **Answer:** _____	
7	A can of oil holds 250 ml of oil. How many cans of oil can be filled from a tank that holds 8 litres of oil? **Answer:** _____	
8	**Evaluate** $25^{-1/2}$. **Answer:** _____	
9	The number x is a factor of 36, a square number and an even number. Find x. **Answer:** _____	

10	At a sale items are reduced by 20%. Work out **the sale price** of a DVD player marked at Lm50. **Answer:** Lm _____	
11	Lm250 are invested at 4% per annum simple interest. After *n* years the interest earned was Lm50. Work out **the value of *n***. **Answer:** _____	
12	The area of the parallelogram PQRS is 25 cm². What is the **area of the triangle PXQ**? **Answer:** _____	
13	One euro is worth 40 cents. **How many euro** will I get for Lm20? **Answer:** _____	
14	If $\sqrt{17.64} = 4.2$, what is **the area of the floor** of a square room having walls of length 4.2 metres? **Answer:** _____	
15	In triangle PQR, PR is three times as long as QR. What is the value of **sin P**? **Answer:** _____	

16	The line $y = 2x - 3$ passes through the point $(-1, b)$. Work out the value of b. **Answer:** _____	
17	AOB is a sector of a circle. The area of the circle is 36π cm^2. Work out the **area of the sector** in terms of π. **Answer:** _____	
18	The point P(3, 4) is reflected in the y-axis. Write down the coordinates of the image of P. **Answer:** _____	
19	Work out the size of x. **Answer:** _____	
20	What is the difference between 10% of Lm955 and 10% of Lm55? **Answer:** _____	

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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	NC	Main	Total

Name: _____   **Class:** _____

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

1.   **Underline** the **TRUE** statement
      A. The square root of a number is always smaller than the original number.
      B. The square root of a number is never smaller than the original number.
      C. The square root of a number is sometimes smaller than the original number.

                                                                    (2 marks)

2.   **Solve the equation**: $(z-1)^2 = 25$.

      Answer: _____
                                                                    (3 marks)

3.   Find the value of n given that
      (i) $2^7 \div 2^n = 32$ (ii) $3^n = \sqrt{81}$

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

4. (a) **Open the brackets** and **simplify**: $(2p - q)^2$.

   (b) **Factorise completely**: $x^4 - 1$.

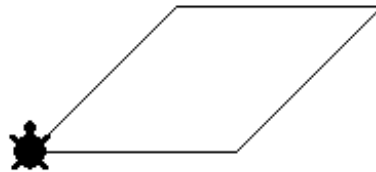   **Answer**: _____

   Answer: _____

   (4 marks)

5. Given that $pv = b + 2(a - p)$ make p the subject of the formula.

   Answer: _____

   (4 marks)

6. (a) Complete the procedure RHOMBUS that draws the rhombus.

   TO RHOMBUS
     RT 45
     REPEAT _____ [FD 100 RT _____ FD _____ RT _____]
     LT 45
   END

   (b) **Fill in**: The **order of rotational symmetry** of the rhombus is _____.

   (5 marks)

7. In Italy a pair of shoes costs 85 euro. The same pair of shoes can be bought in England for £55.
Lm1 = 2.35 euro = £1.59.
Would it be cheaper to buy the shoes in Italy or in England?
How much would I save in Maltese Liri?

Answer: _____

(5 marks)

8. A man borrows Lm10 000 at 9% per annum interest. He repays Lm1800 at the end of each year. He uses a spreadsheet to work out the amount due at the end of each year.
   (a) What **formulae** did he write in cell B3 and cell B6?
   (b) **Fill in** the empty cells to find the amount due **after the second repayment**.

	A	B
1		Lm
2	Sum Borrowed	10000.00
3	Interest (1st year)	900.00
4	Amount due	10900.00
5	1st Repayment	1800.00
6	Amount due	
7	Interest (second year)	
8	Amount due	
9	2nd Repayment	1800.00
10	Amount due	

Answer: (a) _____ _____

(6 marks)

9. VABCD is a right pyramid on a rectangular base.
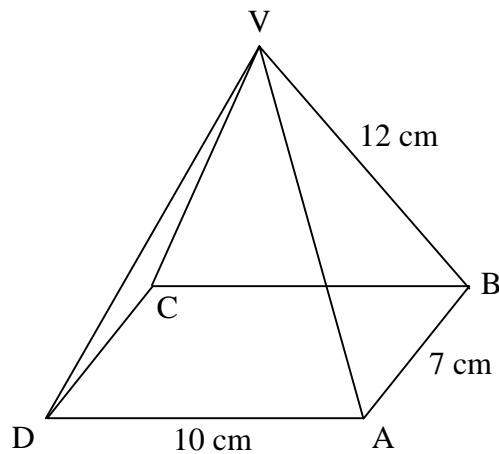   VA = VB = VC = VD = 12 cm.
   AD = 10 cm, AB = 7 cm.
   Work out, correct to 1 decimal place:
   (i)   the **length of BD**,
   (ii) the **height of the pyramid,**
   (iii) the **volume of the pyramid**.
   (Volume of pyramid = $\frac{1}{3}$ base area × height)

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

10. (a) Write the quadratic equation $x - \dfrac{2}{x} = 5$ in the form $ax^2 + bx + c = 0$.

(b) Use the formula $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to **solve the equation** $x - \dfrac{2}{x} = 5$, giving your answers correct to 3 significant figures.
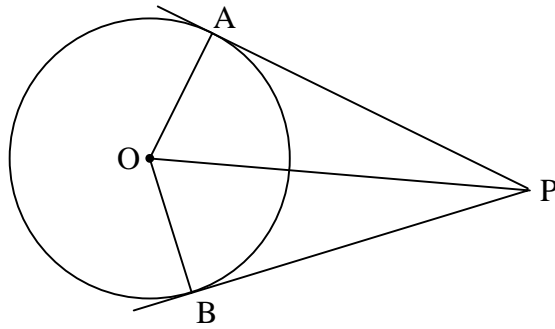
Answer: (a) _____ (b) _____

(6 marks)

11. Each day Mr Borg runs home from work. He has a choice of three routes. The first is 4 km long, the second is 5 km long and the third is 6 km long. Mr Borg chooses the route he runs at random. Work out the probability that on two days Mr Borg runs a total distance of
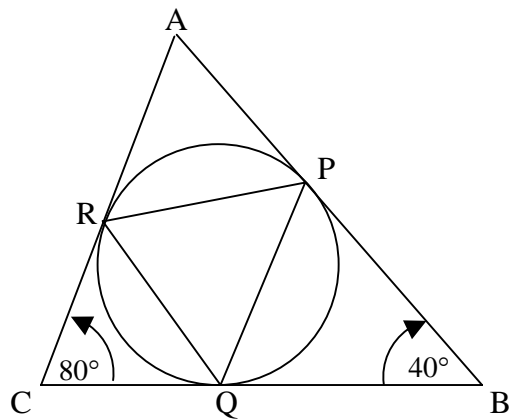(i) 8 km (ii) 9 km (iii) 10 km.

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

(7 marks)

12. (a) AP and BP are two tangents to a circle with centre O. Prove that triangles APO and BPO are congruent.

(b) AB, BC and AC are tangents to the circle. If angle ABC = 40° and angle ACB = 80°, work out the size of (i) angle APR, (ii) angle PQR.

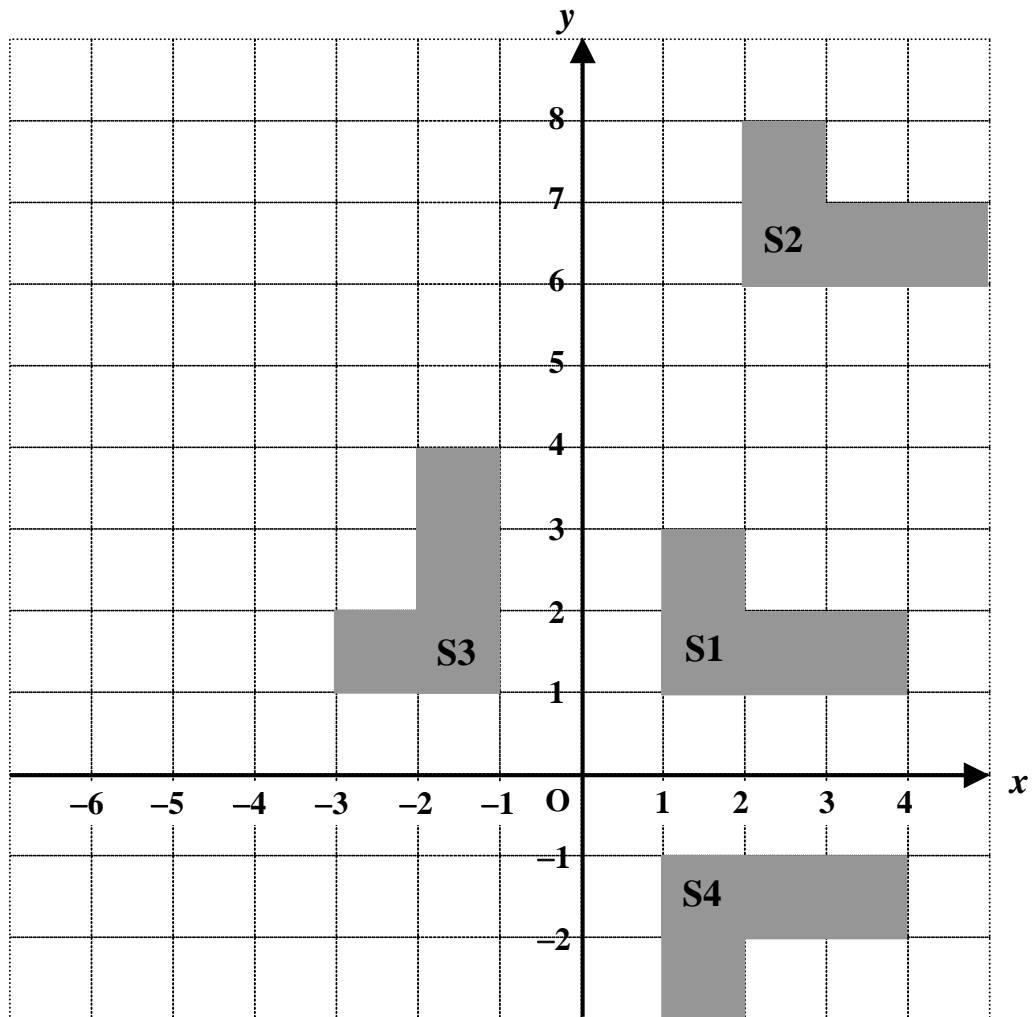**Answer**: (i) _____ (ii) _____

(7 marks)

13. (a) The diagram below shows a shape S1 and its images S2, S3 and S4.
   Describe fully the transformation that will move:

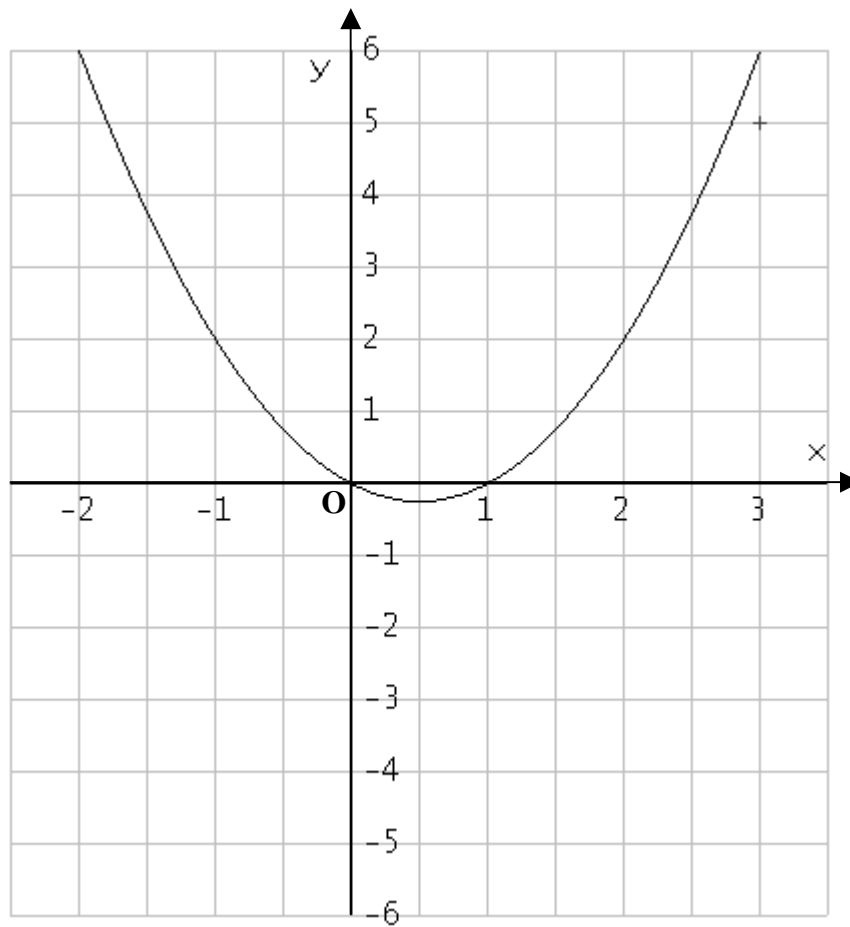   (i) S1 to S2: _____

   (ii) S1 to S3: _____

   (iii) S3 to S4: _____

(b) Draw the image of S3 when it is enlarged by a scale factor of 2 about (1,−1).

(9 marks)

14. The graph of $y = x^2 - x$ is shown below.

(a) **Use this graph** to estimate the solutions of the equations

(i) $x^2 - x = 1$ _____

(ii) $x^2 = x + 3$ _____

(b) Complete the table and, on the same axes, draw the graph of $y = 1 - x$.

x	-1	1	2
y			

(c) The two graphs intersect at P and Q. Write down the coordinates of P and Q.

_____

(d) Write, in the form $ax^2 + bx + c = 0$, the equation whose solutions are the
     x-coordinates of P and Q.

_____

(12 marks)