JUNIOR LYCEUMS ANNUAL EXAMINATIONS 2002
Educational Assessment Unit — Education Division

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

Name: ___________________________ Class: _______

Mark

Instructions to Candidates

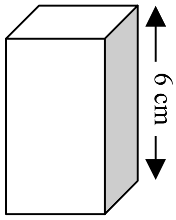
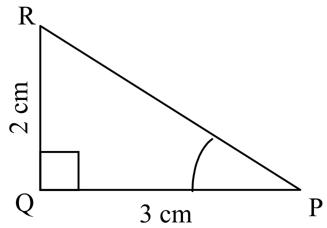
- **Answer all questions. There are 20 questions to answer.**
- **Each question carries 1 mark.**
- **On your desk you should have nothing except for pen, pencil and examination paper.**
- **To answer questions involving numerical calculations you are advised to choose and use the more efficient techniques (mental or paper-and-pencil).**
- **You are not required to show your working. However space for working is provided if you need it.**

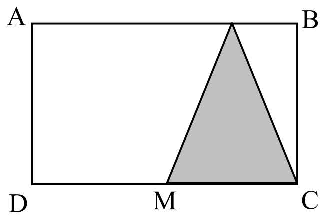
DO NOT

WRITE

IN THIS SPACE

	Question	Space for Working (if required)
1	**Evaluate**: $8 \times 7 - 9$ **Answer:** ___________	
2	**Estimate** the value of $\dfrac{\sqrt{10} \times 1.98^2}{\pi}$. **Answer:** ___________	
3	What is the cost of **102 chairs** at **Lm15.50 each**? **Answer:** ___________	
4	**Underline** the **largest number**. **A.** 1.7×10^3 **B.** 1.7×10^{-3} **C.** 1.0×10^4 **D.** 1.0×10^{-4}	
5	$\mathbf{654 \times 321 = 209934}$ What is the value of $209934 \div 321$? **Answer:** ___________	
6	The area of a square is **12¼** cm^2. **Calculate** the **length** of one of the sides. **Answer:** ___________	
7	**Evaluate**: $\sqrt[3]{32 \times \frac{1}{4}}$ **Answer:** ___________	
8	If **Lm1** $\approx$ **£1.50**, how much does a tourist get for **£1500**? **Answer:** ___________	

9	 The volume of this cuboid is **150 cm^3**. What is the **area** of the base? **Answer:** ___________	
10	**Triangle PQR** is **right-angled** at Q. **Underline** the correct equation. **A.** $\sin P = \frac{2}{13}$ **B.** $\sin P = \frac{3}{13}$ **C.** $\sin P = \frac{2}{\sqrt{13}}$ **D.** $\sin P = \frac{3}{\sqrt{13}}$ 	
11	In a bag there are only **red** discs and **blue** discs. A disc is chosen at random. The probability that the disc is blue is **0.65**. What is the **probability** that the disc is **red**? **Answer:** ___________	
12	What is the value of $\sqrt{p^2 + q^2}$, given that $p^2 = 5$ and $q = -2$? **Answer:** ___________	
13	The **opposite angles** of a **cyclic quadrilateral** are $x°$ and $5x°$. What is the value of $\boldsymbol{x}$? **Answer:** ___________	
14	The sides of a rectangle are in the ratio of **2:3**. The smaller side is 10 cm long. **Work out** the length of the **longer side**. **Answer:** ___________	

15	Find the value of: $\mathbf{\frac{1}{3}+\frac{1}{4}+\frac{1}{5}+\frac{2}{3}+\frac{3}{4}+\frac{4}{5}}$ **Answer:** ___________	
16	One of the following is **not equal** to $\frac{1}{4}$. Which one? **A.** 4^{-1} **B.** $\left(\frac{1}{2}\right)^2$ **C.** 25% **D.** 0.4 **Answer:** ___________	
17	ABCD is a rectangle and M is the **midpoint** of DC. What **fraction** of the rectangle is shaded?  **Answer:** ___________	
18	What is the **cost** of 13 pens at 75 cents each and 13 notebooks at Lm1**.**25 each? **Answer:** ___________	
19	A sum of money was invested in a bank at **10%** per annum. After 1 year the interest paid was **Lm72**. What was the **sum invested**? **Answer:** ___________	
20	If $\mathbf{3^4+3^4+3^4=3^n}$, what is the value of $\boldsymbol{n}$? **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	14	15	NC	Main	Total

Name: ______________________________ **Class:** ________

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

1. (a) **Use your calculator** to find the value of $\sqrt[4]{100}$, giving your answer correct to **2 decimal places**.

   (b) Evaluate $\dfrac{1.6\times10^{4}}{6.4\times10^{-3}}$, giving your answer in **standard form**.

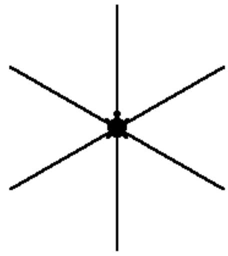
(4 marks)

2. A car was bought for Lm5500. The price of the car **goes down** in value by **12% each year**. Calculate the value of the car after (i) 1 year, (ii) 2 years?

(4 marks)

3. A pupil uses the following **LOGO** statement to draw the six-pointed star shown.

REPEAT 4 [FD 100 BK 100 RT 90]



This statement contains **two mistakes**.

(i) **Write** the correct statement that draws the six-pointed star.

(a) **Write** another statement to draw a **ten-pointed star**.

(4 marks)

4. During a term Mario sat for three mathematics tests. Mario entered the results in a spreadsheet.

(i) In **cell B5** Mario wanted to find the **total** of the three tests. What **formula** should he write?

(ii) In **cell B6** Mario typed the formula **=B5/3**. What value did he get?

	A	B
1	Month	Mark
2	October	57
3	November	72
4	December	63
5	Total	
6	Mean	

=B5/3

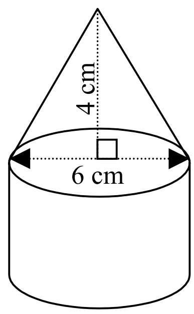
(4 marks)

5. A solid is formed from a **cone** joined to a **cylinder** as shown in the diagram. Calculate:

(i) the **volume** of the cone, **in terms of** π,

(ii) the **height** of the cylinder, given that the volume of the cylinder is three times the volume of the cone.

(Volume of cone = $\frac{1}{3}$base area $\times$ height)



(5 marks)

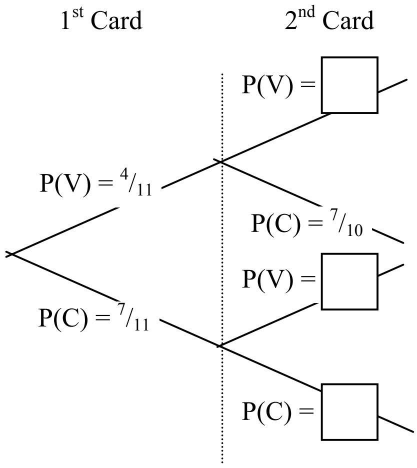
6. The letters of the word **PROBABILITY** are written on eleven cards, one letter on each card. The cards are shuffled and one card is chosen at random.

(i) Find the probability that the card chosen is a **B**.

The experiment is repeated but this time **two cards** are drawn. The first card is **not replaced** after the first card has been drawn.

(ii) **Complete** the probability tree.

(iii) **Write down** the probability that one card is a vowel (V) and the other is a consonant (C).



(6 marks)

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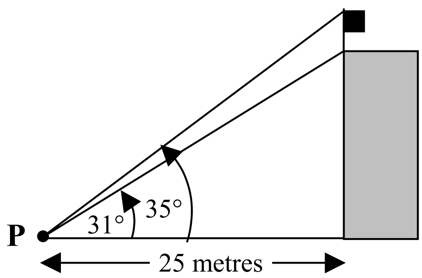
7. A flagpole stands on top of a vertical building. From a point, P, on level ground, **25 metres** from the base of the building, the **angles of elevation** of the **foot** and the **top** of the flagpole are **31°** and **35°** respectively. Calculate, correct to **3 significant figures**,

(i) the **height of the building**,

(ii) the **height of the flagpole**.



(6 marks)

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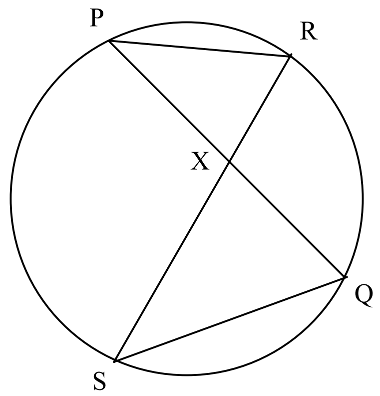
8. PQ and RS are two chords of a circle, intersecting at X.
   (i) Give reasons why triangles PRX and SQX are **similar**.
   (ii) Given that **SX = 6 cm**, **PX = 4 cm** and **SQ = 5 cm**, find the length of **PR**.
   (iii) The area of triangle PRX is 4 cm^2. Work out the **area** of **triangle QSX**.



(7 marks)

9. AB is a **chord** of a circle with centre O. M is the foot of the **perpendicular** from O to AB.

(i) **Prove** that triangles AOM and BOM are **congruent**.

AT is the **tangent** to the circle and angle BOM = 52°.

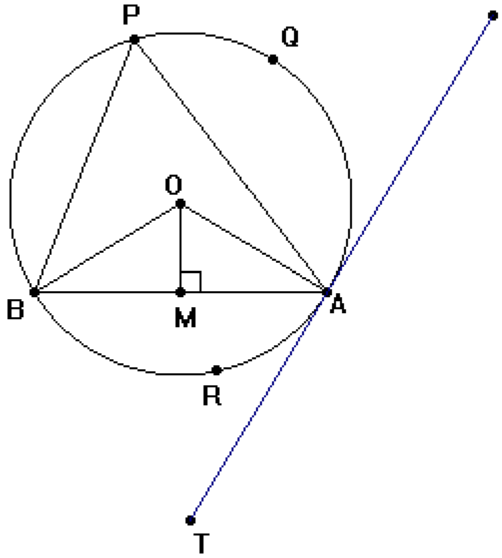
(ii) **Work out** the size of (a) angle APB (b) angle BAT.

P is dragged onto point Q.

(iii) **Write down** the size of angle AQB.

P is dragged onto point R.

(iv) **Write down** the size of angle ARB.



(7 marks)

10. (a) Factorise completely:

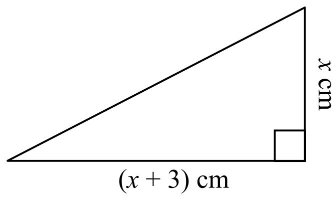
(i) $12x^2 + 3x$ (ii) $2x^2 - 9x - 5$

(b) Simplify: $\dfrac{3}{\boldsymbol{x}^2 - 1} - \dfrac{2}{\boldsymbol{x} + 1}$

(8 marks)

11. (a) Solve $4\boldsymbol{x}^2 = 7\boldsymbol{x} - 1$, giving your answers correct to **2 decimal places**.

(b) The area of this right-angled triangle is **20 cm²**. Form an equation and solve it to find the value of x.



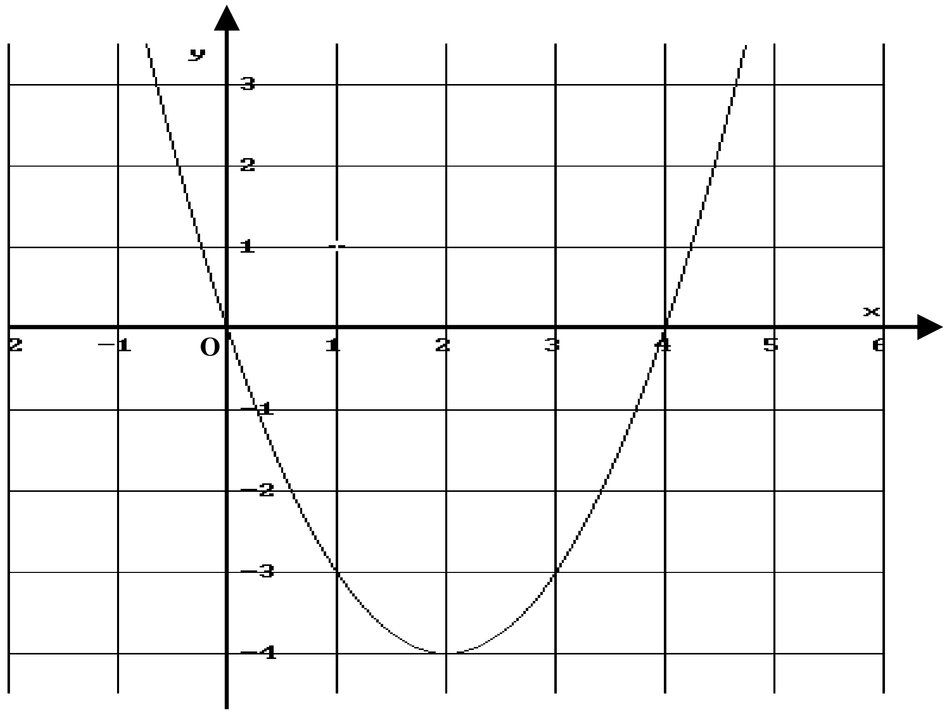
Solutions of $ax^2 + bx + c = 0$ are $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

(8 marks)

~~12. (a) Underline the equation whose graph is shown below.~~

(i) $y = x^2 + 4x$ (ii) $y = 4x - x^2$

(iii) $y = x^2 - 4x$ (iv) $y = x^2 + 4x + 4$



(b) **On the same diagram** draw the graph of $y = x - 4$.

(c) Write down the **coordinates** of the **points of intersection** of the two graphs.

(d) Write down **a quadratic equation** that will have the *x*-coordinates of these points as roots.
Express this equation in the form $ax^2 + bx + c = 0$.

(8 marks)

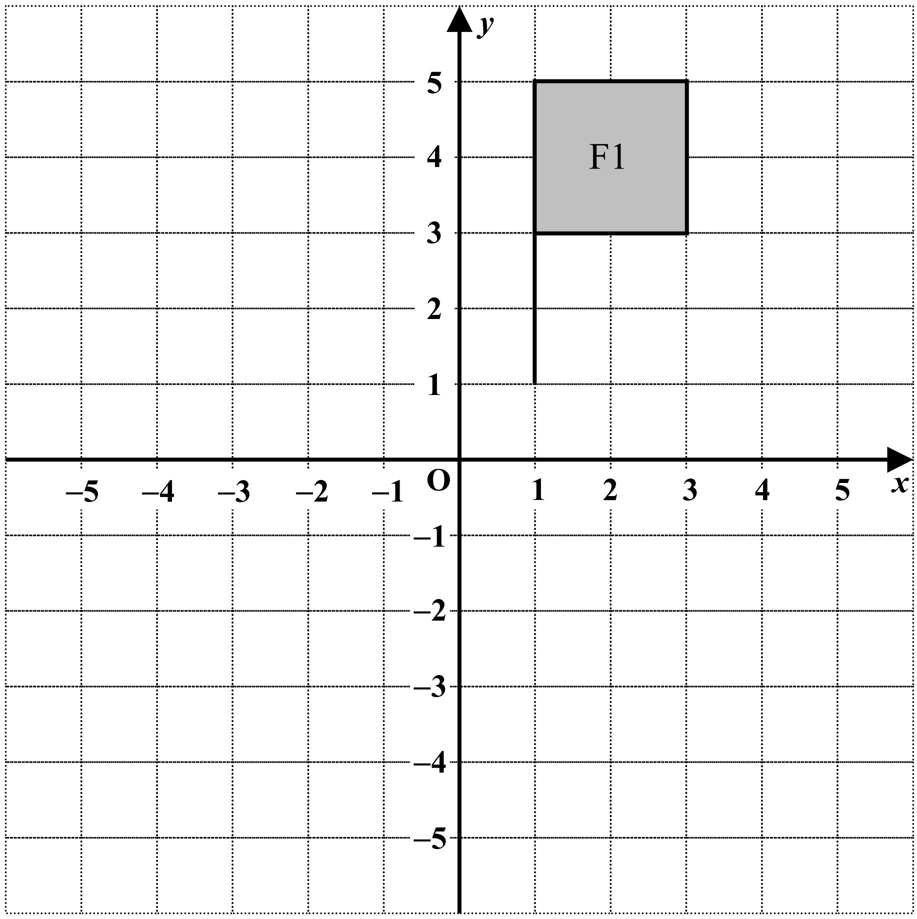
13. The diagram shows a picture of a flag, **F1**.

(i) **Rotate F1 clockwise** about the point **(0, 0)** through an angle of **90°**. Call this second flag **F2**. Draw and label **F2**.

(ii) Draw the line $y = x$. **Reflect F2** in the line $y = x$. Call this third flag **F3**. Draw and label **F3**.

(iii) **Translate F3** by a vector of $\begin{pmatrix} 0 \\ -6 \end{pmatrix}$. Call this fourth flag **F4**. Draw and label **F4**.

(iv) Describe fully **a single transformation** that will map **F3** to **F1**.



(9 marks)