

SECONDARY SCHOOL ANNUAL EXAMINATIONS 2010

Directorate for Quality and Standards in Education
Educational Assessment Unit

FORM 3 MATHEMATICS (Non-Calculator Paper) TIME: 30 minutes

1	2	3	4	5	6	7	8	9	10	Total

DO NOT WRITE ABOVE THIS LINE

Name: _____

Class: _____

INSTRUCTIONS TO CANDIDATES

- Answer ALL questions
- This paper carries a total of 25 marks
- Calculators and protractors are NOT ALLOWED

1. Calculate the **simple interest** on €5000 invested at 6% per annum for $3\frac{1}{2}$ years.

Ans: _____

(2 marks)

2. Work out the **selling price** of a watch bought for €60 and sold at a profit of 20%.

Ans: _____

(2 marks)

3. I think of a number, multiply it by 4 and add 5. The answer is 57. What is the **number**?

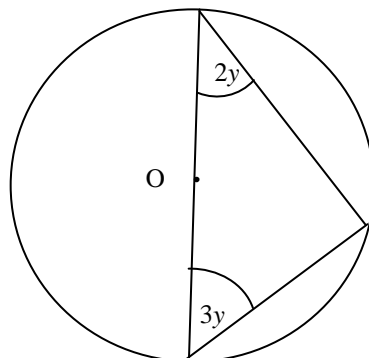
Ans: _____

(2 marks)

4. a) **Solve** the equation $4x + 8 = 29 + x$.

Ans: $x =$ _____

b) Use the diagram to find the **value** of y .



Ans: $y =$ _____

(4 marks)

5. Which is the **larger** 2^{-3} or 3^{-2} , and by how much?

Ans: _____

(3 marks)

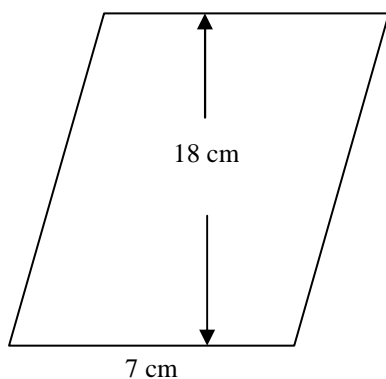
6. Put the following numbers in order of size, starting with the **smallest**.

$$\frac{3}{4}, \sqrt{5}, 0.5, \frac{2}{5}, \frac{7}{10}, \frac{\pi}{3}$$

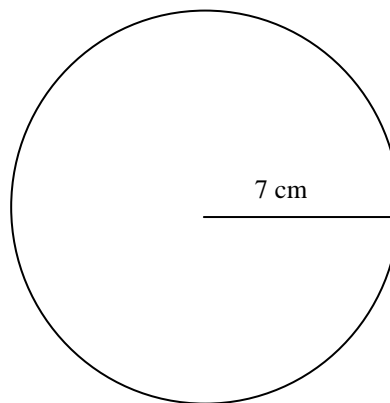
Ans: _____; _____; _____; _____; _____; _____.

(3 marks)

7. Which of the two shapes below has the **larger area**, and by how **much**?
(The diagrams are **not** to scale.)



Parallelogram



Circle (Take $\pi = \frac{22}{7}$)

Ans: _____; _____

(3 marks)

8. Each exterior angle of a regular polygon is 15° . How **many sides** does this polygon have?

Ans: _____

(1 mark)

9. AB is a straight line joining the points A (3,4) and B (1,6). What is the **gradient** of line AB?

Ans: _____

(2 marks)

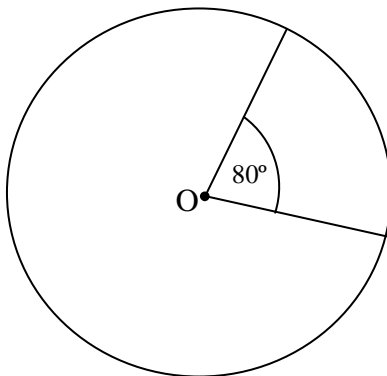
10. a) Work out : i) 4% of 150 m

Ans: _____

ii) $\frac{3}{10}$ of 850 kg

Ans: _____

b) What **fraction** of the circle's area is the area of the minor sector shown?
(O is the centre of the circle. Give the answer in the lowest terms.)



Ans: _____

(3 marks)

END OF PAPER

SECONDARY SCHOOL ANNUAL EXAMINATIONS 2010

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FORM 3

MATHEMATICS (Main Paper)

TIME: 1h 30min

1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total Main	Non Calculator	GLOBAL MARK

DO NOT WRITE ABOVE THIS LINE

Name: _____

Class: _____

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

1. a) **Work out:** $5^{99} \div 5^{97}$

Ans: _____

b) The mass of an elephant is 20,000 kg. Write this number in **standard form**.

Ans: _____

c) Write 8.3×10^{-5} as an **ordinary number**.

Ans: _____

(3 marks)

2. a) **Factorise:** $8a - 4b + 16c$.

b) **Expand:** $(x - 5)^2$

Ans: _____

Ans: _____

c) The formula for the n^{th} term of a sequence is $4n - 3$.

i) Write down the first 4 terms of the sequence.

Ans: _____, _____, _____, _____

ii) Which term is equal to 117?

Ans: _____

(5 marks)

3. a) **Draw** a circle of radius 3 cm. Construct a regular hexagon of side 3 cm inside this circle.
- b) Use your protractor to **measure** one of the interior angles. **Ans:** _____
- c) Show how you can check your answer by using the formula for the sum of the interior angles.

(5 marks)

4. Gail and Thomas start a business. Gail invests €9,000 and Thomas €15,000.
Each month Gail and Thomas share profits in the same ratio of their investment.

- a) Write the ratio €9,000: €15,000 in its **simplest form**.

Ans: ____ : ____

- b) In May the profit is €800. How much does **each** get?

Ans: Gail ____; Thomas ____

- c) In June Gail gets €480. Work out the **total** profit.

Ans: _____

- d) In July Gail gets €312 less than Thomas. How much does **each** receive?

Ans: Gail ____; Thomas ____

(7 marks)

Name: _____

Class: _____

5. The heights, in metres, of a group of people are:

1.62, 1.75, 1.90, 1.78, 1.60, 1.65, 1.54, 1.85, 1.65, 1.76.

a) What is the **modal** height ?

Ans: _____

b) What is the **median** height ?

Ans: _____

c) Show that the **mean** height is 1.71 m.

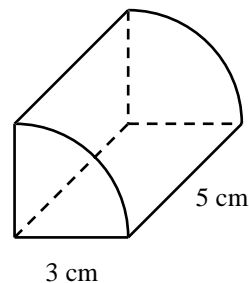
d) When a new member joins the group, the mean height becomes 1.7 m.

Is this new member **taller or shorter** than 1.71 m? **Why?**

Ans: _____

(5 marks)

6. a) The diagram shows a prism. Its uniform cross-section is a quarter of a circle of radius 3 cm. The prism is 5 cm long. Find its **volume**.
Give your answer correct to the **nearest cm³**



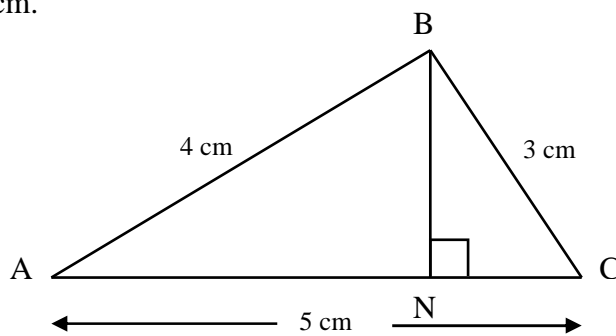
Ans: a) _____

b) A cylinder is **closed at both ends**. Its diameter is 4 cm and its height is 12 cm. Calculate the **total surface area** of the cylinder. Give your answer correct to **2 decimal places**.

Ans: b) _____

(6 marks)

7. The diagram shows triangle ABC in which AB is 4 cm, AC is 5 cm and BC is 3 cm. BN is perpendicular to AC.



- a) What is the size of $\angle ABC$?

Ans: _____

- b) Work out the area of triangle ABC.

Ans: _____

- c) Using your answer to part b), or otherwise, work out the length of BN.

Ans: _____

- d) Work out the length of AN.

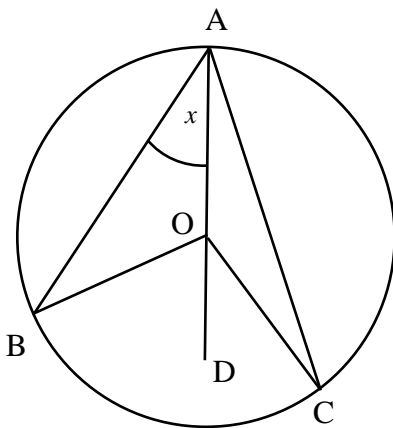
Ans: _____

(6 marks)

Name: _____

Class: _____

8. a) In the diagram O is the centre of the circle. A, B and C are points on the circumference.



Fill in: i) $\angle ABO = x^\circ$ reason: _____

ii) $\angle BOD = \underline{\hspace{2cm}}$ reason: exterior angle of a Δ is equal to the sum of the opposite interior angles.

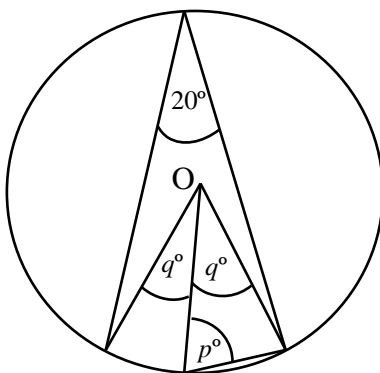
Let $\angle CAO$ be y° . Fill in:

iii) $\angle COD = \underline{\hspace{2cm}}$

Use the above facts to show that:

iv) $\angle BOC$ is twice $\angle BAC$.

b) Find the **angles** marked p and q in the diagram below. O is the centre of the circle.



Ans: $p = \underline{\hspace{2cm}}$, $q = \underline{\hspace{2cm}}$

_____ (7 marks)

9. The equation of a curve is $y = 9 - x^2$.

a) **Complete** this table of values.

x	-4	-3	-2	-1	0	1	2	3	4
9	9	9	9	9				9	
$-x^2$	-16		-4	-1		-1	-4	-9	-16
y	-7		5	8	9	8	5	0	

b) Using a scale of 2 cm for 1 unit on the x -axis and 1 cm for 1 unit on the y -axis **draw** the graph of $y = 9 - x^2$.

c) What are the **coordinates** of the maximum point? **Ans:** $x = \underline{\hspace{2cm}}$; $y = \underline{\hspace{2cm}}$

d) **Use your graph** to solve the equation $9 - x^2 = 3$. Give your answers correct to 1 decimal place.

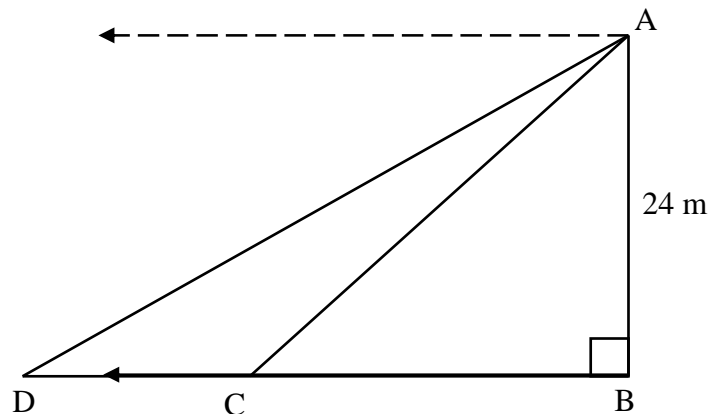
Ans: $x = \underline{\hspace{2cm}}$; $\underline{\hspace{2cm}}$

(9 marks)

10. From A the angle of depression of C is 54° and of D is 39° . AB is 24 m high.

Calculate, correct to 3 **significant figures**:

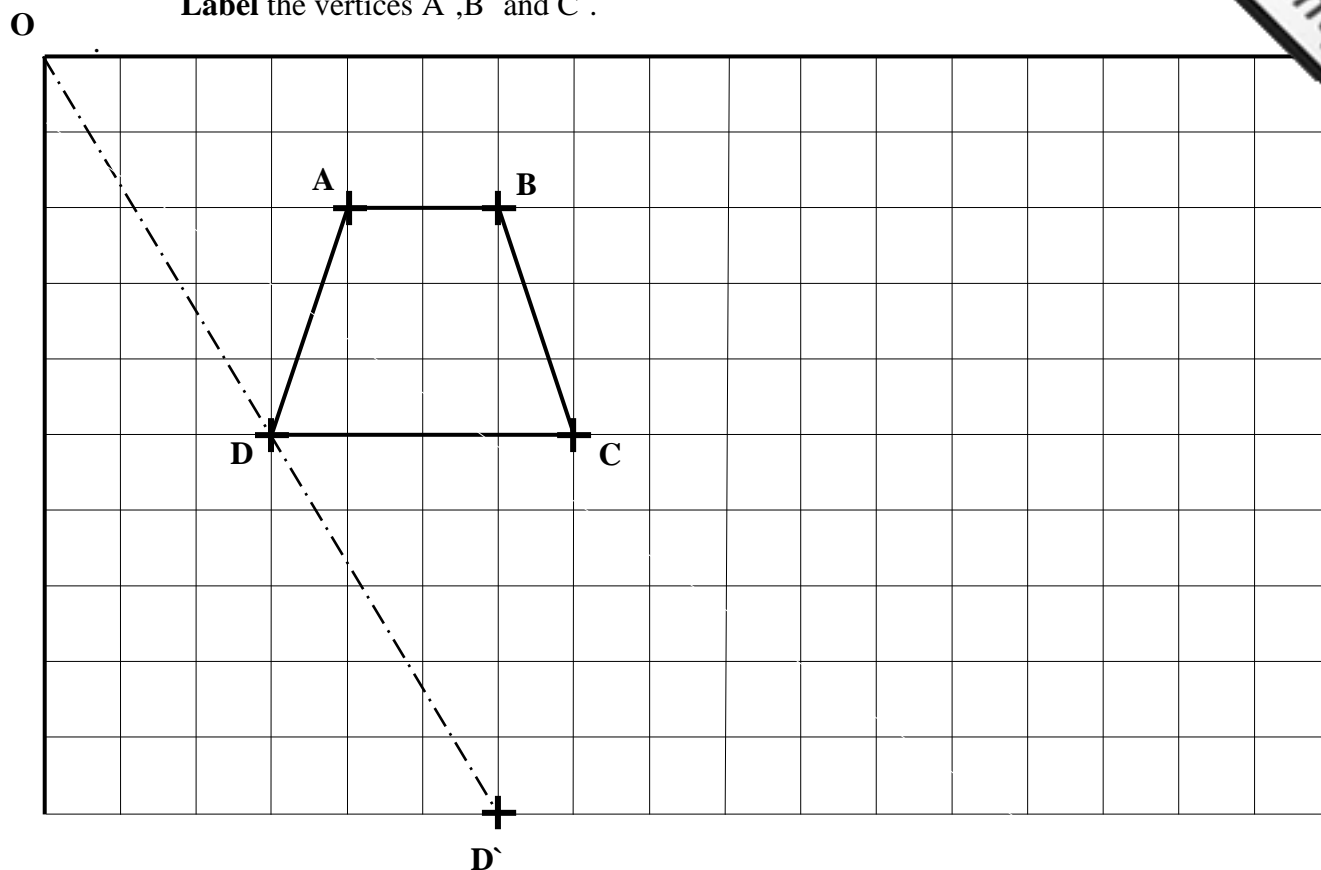
i) the distance BC ii) the distance CD.



Ans: i) BC = $\underline{\hspace{2cm}}$ ii) CD = $\underline{\hspace{2cm}}$

(5 marks)

11. a) Using O as the centre of enlargement and a scale factor of 2, **draw** the enlargement of ABCD. The image D' of vertex D has been plotted for you.
Label the vertices A', B' and C'.



- b) A ship sails 10 km from A on a bearing of 100° to point B. It then sails 12 km to C on a bearing of 070° . Using a scale of 1 cm to represent a distance of 2 km, draw a diagram to show this information.
Measure the length AC and write down the actual distance from A to C. Give your answer correct to the nearest km.



Ans: _____
(5 marks)

12. a) The formula for converting a temperature in degrees Fahrenheit to degrees Celsius

by $C = \frac{5}{9}(F - 32)$.

i) **Find** the value of C when $F = 68$.

Ans: _____ °C

ii) Make F the **subject** of the formula.

Ans: _____

iii) **Find** the value of F when $C = 30$.

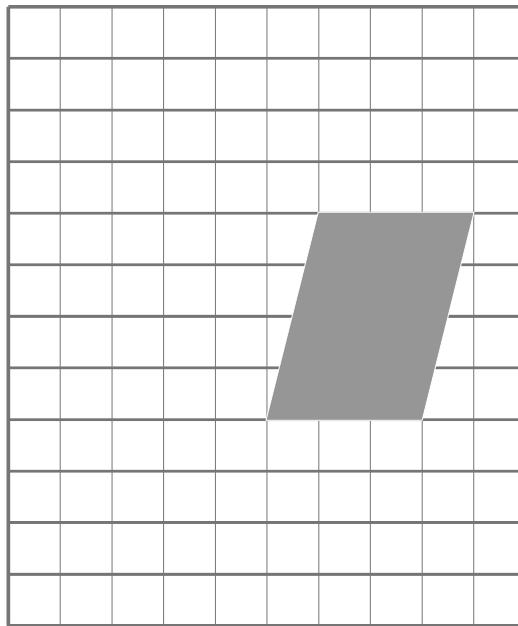
Ans: _____ °F

b) **Solve** the simultaneous equations: $x + y = 5$ and $y = 1 + x$.

Ans: $x =$ _____ $y =$ _____

(8 marks)

13. a) (i) **Draw** a tessellation of 4 more parallelograms using the parallelogram on the grid



(ii) Is it true that all parallelograms **tessellate**?

Ans: _____

- b) One bag contains one 5c coin and two 10c coins. A second bag contains two 5c coins, one 10c coin and one 20c coin. One coin is taken at random from each bag. The possibility space below shows the total value of the two coins taken.

		1 st bag		
		5c	10c	10c
2 nd bag	5c	10c	15c	
	5c	10c		
	10c	15c		20c
	20c		30c	

(i) **Complete** this possibility space to show all the possible outcomes.

(ii) **Find** the probability that the total value of the two coins is 25c. **Ans:** _____

(4 marks)

END OF PAPER

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