GOVERNMENT OF MALTA
MINISTRY FOR EDUCATION, SPORT, YOUTH
RESEARCH AND INNOVATION
DEPARTMENT OF EXAMINATIONS

Qualifying Examination for Supply Learning Support Educators

January 2024

Subject: **Mathematics**

Date: **Friday 26ᵗʰ January 2024**

Time: **One hour and thirty minutes**

Instructions to candidates:

- Answer ALL questions.
- Write your answers in the space available on the examination paper.
- Show clearly all the necessary steps, explanations, and construction lines in your working.
- Unless otherwise stated, diagrams are drawn to scale.
- The use of non-programmable scientific calculators with statistical functions and of mathematical instruments is allowed.
- Candidates are allowed to use transparencies for drawing transformations.
- This paper carries a total of 100 marks.

Question No.	1	2	3	4	5	6	7	8	9
Mark									

Question No.	10	11	12	13	14	15	16	Total	
Mark									

1. a) Work out the following:

   (i) Express $\frac{2}{5}$ as a decimal.

   Ans _____

   (ii) Write a prime number that lies between 20 and 30.

   Ans _____

   (iii) If two even numbers are multiplied together, the result is always:

   A) Odd number   B) Square   C) Even
                           number   number

   Ans _____

   b) Simplify $a^5 \times a^2$

   Ans _____

   c) Write the following in **descending order**:

        8.051   80.51   0.8051   805.

   Ans _____, _____, _____, _____.

   (6 marks)

2. The following are the marks obtained in a test:

72   55   55   64   72   51   72

a) Work out the **mean** mark.

Ans _____

b) Calculate the **median**.

Ans _____

c) Calculate the **mode**.
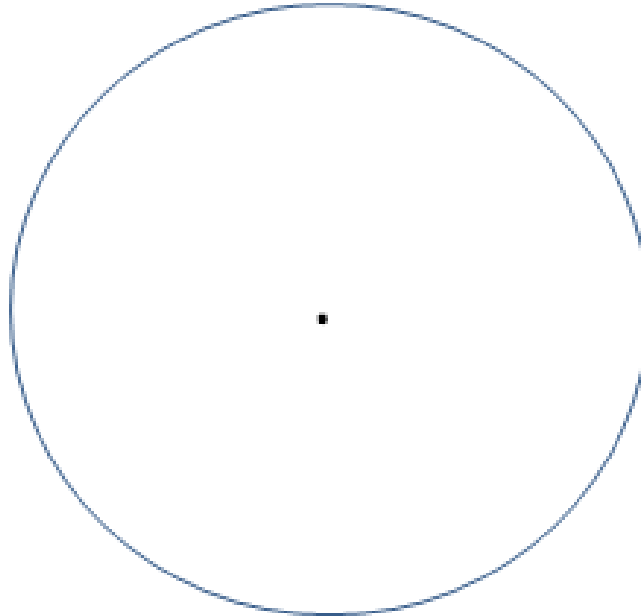
Ans _____

d) Calculate the **range**.

Ans _____

(6 marks)

_____

3. The table below shows the number of pets taken to a veterinary clinic.

Dogs	20
Cats	25
Birds	15
Total	**60**

Draw a **pie chart** to represent this data.

(5 marks)

_____

4. Robert is preparing a flour mix for a particular cake.
   He uses the following grains:

   Wheat, **rice** and **oats** in the ratios of $1:3:2$.
   He wants to prepare 1200g of flour mix.

   a) How many grams of **oats** does he need?

   Ans _____

   b) How many grams of **rice** does he require if he uses 800g of oats?

   Ans _____

(5 marks)

_____

5. a) Fill in the missing terms of the following sequence:

27, 24, 21, _____, 15, _____.

b) Fill in the missing terms in the following sequence:

Terms of the Sequence	1st	2nd	3rd	4th	5th	...	8th	n^{th}
Sequence	5	10	15	20		...		

(5 marks)

_____

6. A clothes shop is offering the following discounts:

- 20% on the total price when purchasing 2 items.
- 30% on the total price when purchasing 3 or more items.

Carla and Tina go shopping together.

Carla chooses a pair of jeans costing €45 and a pair of gym shoes costing €75.
Tina chooses a blouse costing €35 and a skirt costing €45.

a) How much will Carla **pay** if she buys her two chosen items?

Ans _____

b) Calculate the **discount** if Carla and Tina buy their four items together.

Ans _____

(7 marks)

_____

7. a) Evaluate: $3a + 5b$ where $a = 6$ and $b = 2$.

Ans: _____

   b) Expand and simplify: $2(5c + d) + 7(c + d)$

Ans: _____

   c) Solve the equation: $2(x - 4) = 3 + x$

Ans: _____

(7 marks)

_____

8. a) Factorise completely: $6x^2 + 3xy - 9x$

Ans: _____

   b) $f(x) = 15 - 7x$

      (i) Calculate the value of $f(2)$.

Ans: _____

      (ii) Calculate the value of x when $f(x) = 8$.

Ans: _____

   c) The surface area A of a sphere of radius r is given by the formula:
$$A = 4\pi r^2$$
   Make r the subject of the formula.

Ans: _____

(8 marks)

_____

9. On a farm, there are x chickens and y pigs. The total number of chickens and pigs on the farm is 71 and their total number of legs is 180.

a) Form two simultaneous equations in terms of x and y.

Ans: _____

Ans: _____

b) Solve the simultaneous equations to find the number of chickens and pigs on the farm.

Ans: _____

(6 marks)

_____

10. The diagram shows an open box. The bottom of the box is divided into equally sized small squares shaded black, grey, or white.

A ball, which is smaller than each small square, is randomly thrown inside the box.

a) On which colour is the ball most likely to stop?

Ans: _____

b) What is the probability that the ball:

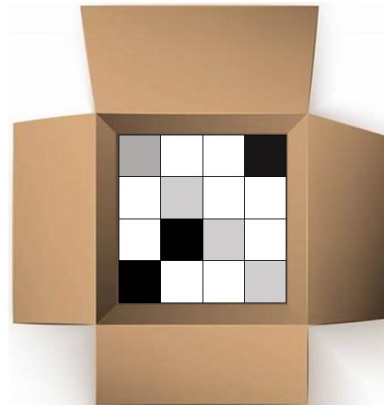(i) Stops on a black square;

Ans: _____

(ii) Stops on a grey box;

Ans: _____

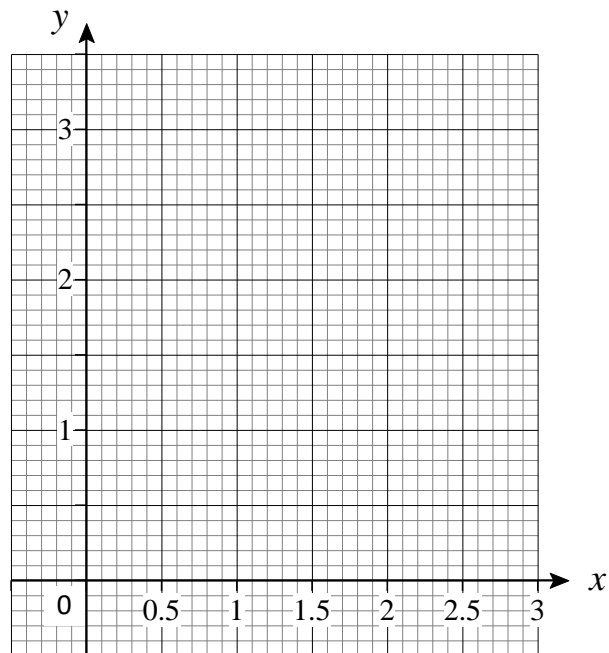(iii) Does not stop on a white box.

Ans: _____

(5 marks)

_____

11. a)   Complete the table below for the equation: $y = 3x - x^2$

x	0	0.5	1	1.5	2	2.5	3
$3x$		1.5			6		
$-x^2$		-0.25			-4		
y		1.25			2		

d) Draw the graph of $y = 3x - x^2$ on the grid below.

e) Draw the straight line $y = 1.5$ on the grid above.

f) Write down the values of x where the graph of $y = 3x - x^2$ intersects with the straight line $y = 1.5$.

Ans: _____ ; _____

(8 marks)

12. a) Two triangles are **congruent**. Underline the statement that is true.

   A. The areas of the two triangles are always equal.

   B. The areas of the two triangles are sometimes equal.

   C. The areas of the two triangles are never equal.

   b) Underline the correct transformation from P to Q.
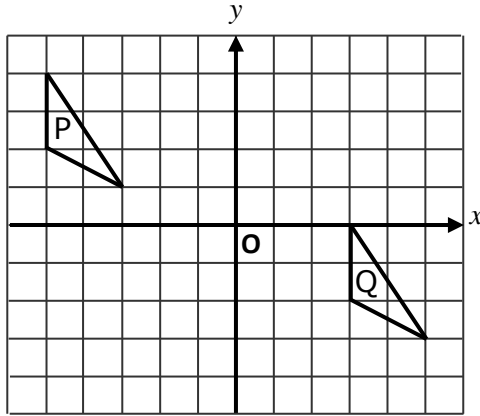
   A. Reflection   B. Rotation   C. Translation   D. Enlargement

   c) i) Underline the correct angle.

   The exterior angles of a **polygon** add up to:

   A. 90°   B. 180°   C. 360°   D. 540°

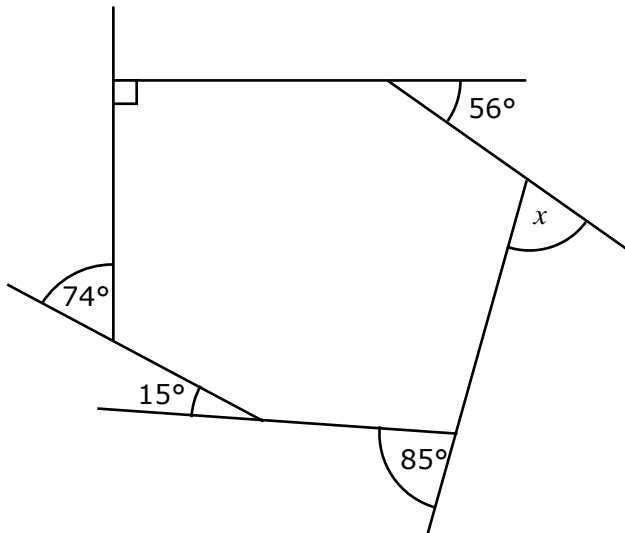   ii) Calculate the size of the angle marked x in the following polygon.

   Diagram not drawn to scale.

   Ans: $x =$ _____

   (5 marks)

13. Work out the following angles giving reasons.

(i) ∠ADC = _____

Reason: _____

(ii) ∠ABC = _____

Reason: _____

(iii) ∠OAC = _____

Reason: _____
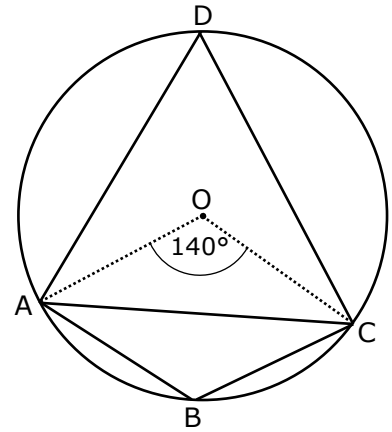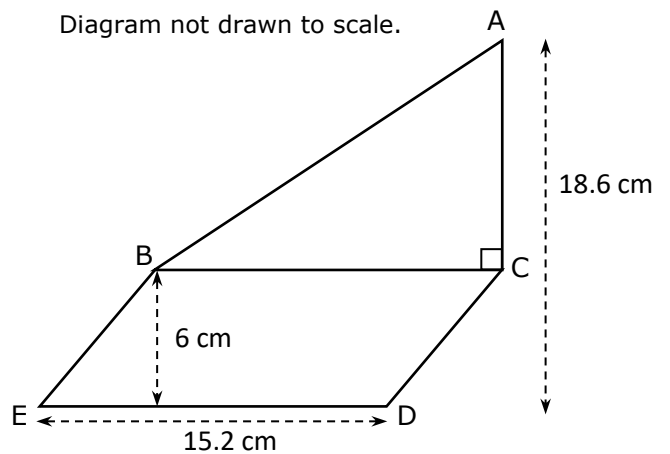
D

O
140°

A

C

B

Diagram not drawn to scale.

(6 marks)

_____

14. The diagram shows the cross-section of a prism. It is made up of a right-angled triangle ABC and a parallelogram BCDE.

a) Calculate the area of the cross-section.

Diagram not drawn to scale.

A

18.6 cm

B

C

6 cm

E

D

15.2 cm

Ans: _____

b) The depth of the prism is 12.5 cm. Work out the volume of the prism.

Ans: _____

(6 marks)

_____

15. Simon is planning a trekking course. Point B is 7.5 km from the starting point A on a bearing of 060°. Point C is 5 km from B on a bearing of 150°.
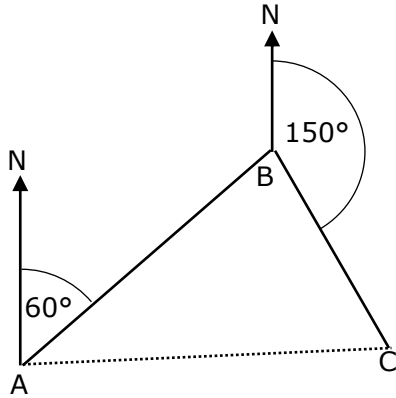

Diagram not drawn to scale.

a) What is the bearing of A from B?

Ans: _____

b) i) Show that ∠ABC is right-angle.

ii) Calculate ∠ACB

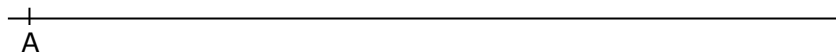Ans: _____

iii) Work out the distance AC.

Ans: _____

(9 marks)

_____

16. a) Use ruler and compasses only to construct a triangle ABC where
       AB = 8 cm, AC = 6 cm, and angle ∠BAC = 60°. Point A is already marked.

┤——
A

   b) Draw the perpendicular bisector of the line AB and name X the point
      where it cuts AB.

   c) Measure and write down the length of CX.

Ans: CX = _____

(6 marks)

_____

End of Paper