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

Qualifying Examination for
Supply Learning Support Educators

November 2024

Subject:	**Mathematics**
Date:	**Wednesday 6ᵗʰ November 2024**
Time:	**9:00am – 10:30am (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 mathematical instruments and non-programmable scientific calculators with statistical functions 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
Mark								

Question No.	9	10	11	12	13	14	15	16	Total
Mark									

1. Circle the correct answer:

    (a) A factor of 32. | 3 | 5 | 8 | 10 |

    (b) 5.432 correct to one decimal place. | 5.0 | 5.3 | 5.4 | 5.5 |

    (c) A square number. | 49 | 50 | 55 | 56 |

    (d) A prime number. | 21 | 25 | 29 | 33 |

(4 marks)

2. Look at this sequence of patterns.

    Pattern 1   Pattern 2   Pattern 3   Pattern 4
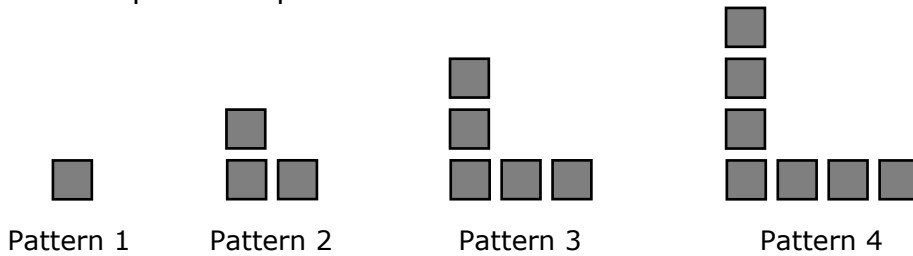
    (a) Complete the table below.

Pattern	1	2	3	4	5	6
Number of squares	1	3	5			

    (b) Write a formula for the nth term of the sequence of patterns shown above.

Ans: _____

    (c) Calculate the total number of squares needed to make the 30$^{\text{th}}$ pattern.

Ans: _____

(4 marks)

3.   The recipe below makes 12 muffins:

240 g flour

150 g sugar

250 ml milk

60 ml vegetable oil

1 egg

(a)   Write the ratio **sugar : flour** in its simplest form.

Ans: _____

(b)   Nina bakes 108 muffins for an event.

(i)   Nina thinks that 2 kilograms of flour are enough.
Is she correct? Show your working.

Ans: _____

(ii)   Nina packs the baked muffins in boxes of 4 and sells each box at €5.50.
How much money does Nina collect if she sells all the boxes?

Ans: _____

(7 marks)

4. Thirty children took part in a survey about the number of cousins they have.
The results are shown in the table below.

Number of cousins	Frequency
0	7
1	11
2	7
3	3
4	2

(a) Work out the mean number of cousins.

Ans: _____

(b) Represent the information, given in the frequency table above, in a pie-chart.
Label your pie-chart.
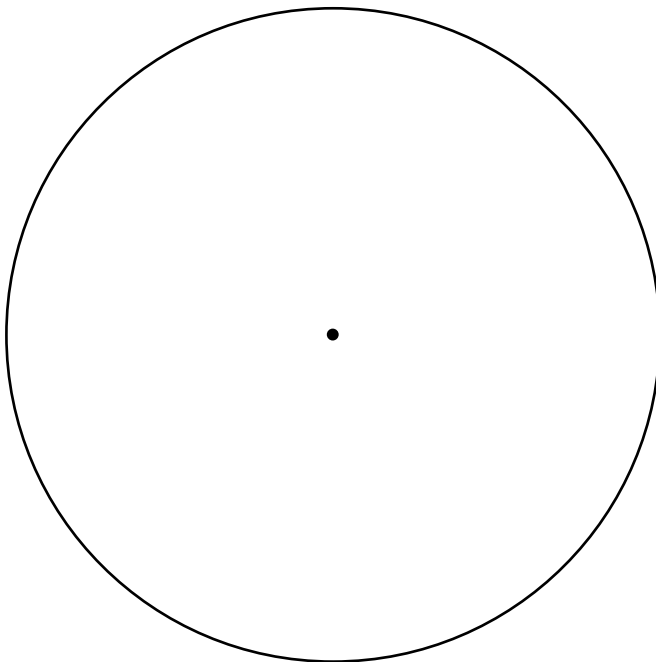
(c) Maria states that 25% of the children taking part in the study do not
have any cousins. Is Maria correct? Explain your reasoning.

(9 marks)

5. Use the function $f(x) = 21 - 9x$ to answer the questions below.

    (a) Find the value of $f(2)$.
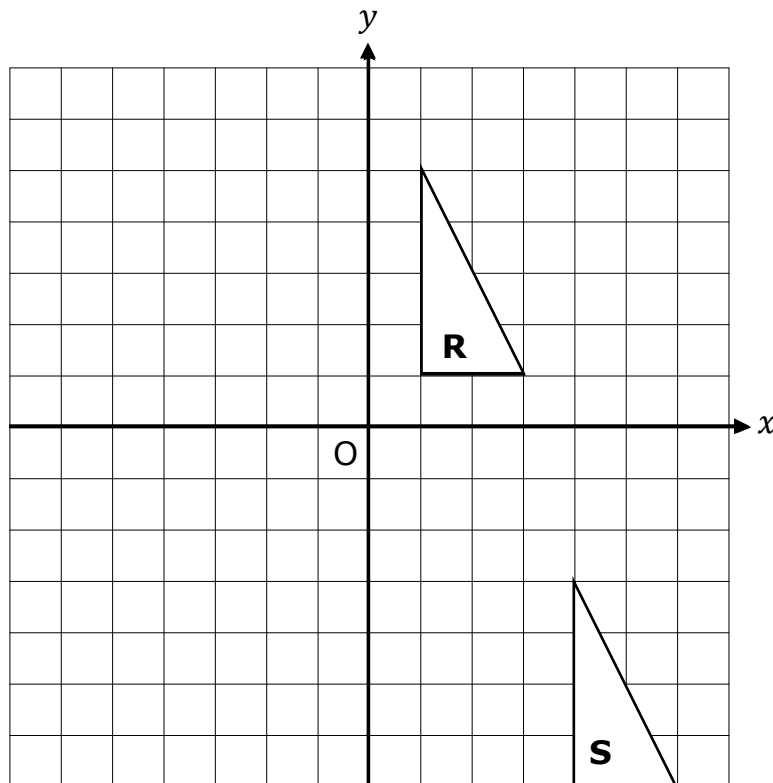
    Ans: _____

    (b) If $f(x) = -15$, work out the value of x.

    Ans: _____

    (4 marks)

6.

On the grid above:

    (a) Reflect triangle **R** in the y-axis. Label the image as **A**.

    (b) Rotate triangle **R** by 90° clockwise about O. Label the image as **B**.

    (c) Describe the single transformation that maps triangle **R** to triangle **S**.

    Ans: _____

    (6 marks)

7. Paula knits scarves using balls of wool from two different baskets. She picks a ball of wool from Basket 1 which contains one white (W), one red (R) and one green (G) ball of wool. She picks another ball of wool from Basket 2 which contains one yellow (Y), one blue (B) and one red (R) ball of wool.

(a) Fill in the possibility space below to show all the different coloured scarves that Paula can knit.

		Basket 2		
		Yellow (Y)	Blue (B)	Red (R)
Basket 1	White (W)	(W, Y)		
	Red (R)			
	Green (G)			

(b) Work out the probability that Paula makes:

(i) a one-coloured scarf

Ans: _____

(ii) a red and purple scarf

Ans: _____

(iii) a scarf with one of its colours white.

Ans: _____

(5 marks)

8. (a) Factorise completely: $16xy^2 - 4y$

Ans: _____

8. (b) Expand and simplify: $x(3x + 6) - 2(4 + 2x)$

Ans: _____

(c) Solve: $8x - 7 = 8 + 2x$

Ans: _____

(7 marks)

9. (a) Make x the subject of the formula: $16ax - 7 = 4y$

Ans: _____

(b) Solve these two equations simultaneously.

$$3x + 4y = 26$$
$$x - 2y = -8$$

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

(6 marks)

10. Luca inherited €35 000 from his grandma and uses part of the money as follows:

- 25% of the sum is used to pay the annual apartment rent
- $\frac{4}{7}$ of the sum is used to buy a new car.

(a) (i) How much is Luca's annual apartment rent?

Ans: _____

(ii) Luca has to pay a contract fee that amounts to 6% of the annual apartment rent.
How much does Luca pay in total for renting the apartment?

Ans: _____

(b) Work out the amount of money Luca has left after paying for the apartment rent and buying a new car.

Ans: _____

(c) Write the amount left as a percentage of the inherited amount.

Ans: _____

(9 marks)

11. In the diagram below, AOD is a diameter of circle centre O. Work out the value of the angles marked x, y and z, giving reasons for your answers.
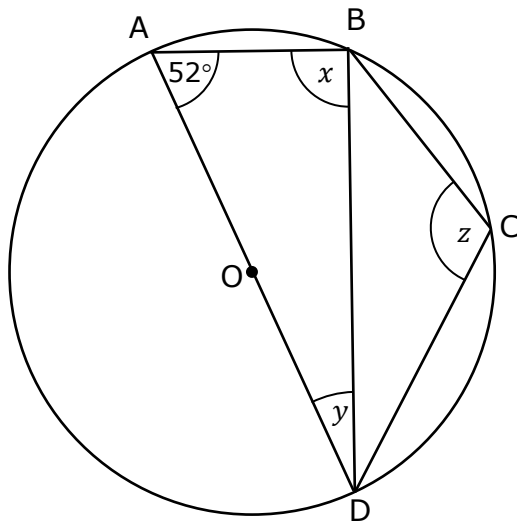
Diagram not drawn to scale

$x = $ _____

Reason: _____

$y = $ _____

Reason: _____

$z = $ _____

Reason: _____

(6 marks)

12. *Use ruler and compasses only in this question.*

(a) At point X, marked below, draw line XY = 10 cm.

(b) Construct an angle of 90° at X.

(c) Construct triangle XYZ, such that XZ = 8 cm.

(d) Construct the angle bisector of angle XYZ.
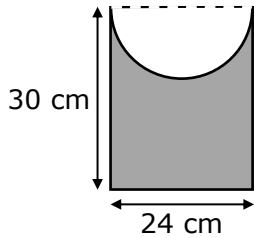

X

(e) Let the bisector drawn in (d) meet line XZ at W.
Take the necessary measurements to calculate the area of triangle WXY.

Ans: _____

(8 marks)

13. (a) The diagram below shows the cross-section of a concrete structure. The cross-section consists of a rectangle measuring 30 cm by 24 cm from which a semicircle of radius 12 cm is removed.
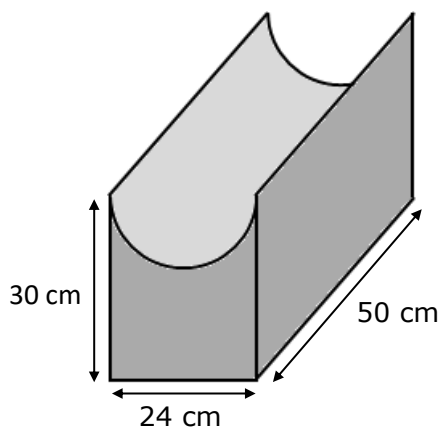
Calculate the area of the remaining (shaded) shape.

Diagram not drawn to scale

Ans: _____

(b) The diagram below shows the concrete structure of uniform cross-section. The structure measures 30 cm by 24 cm by 50 cm. Use your answer in part (a) to calculate the volume of concrete in the structure.
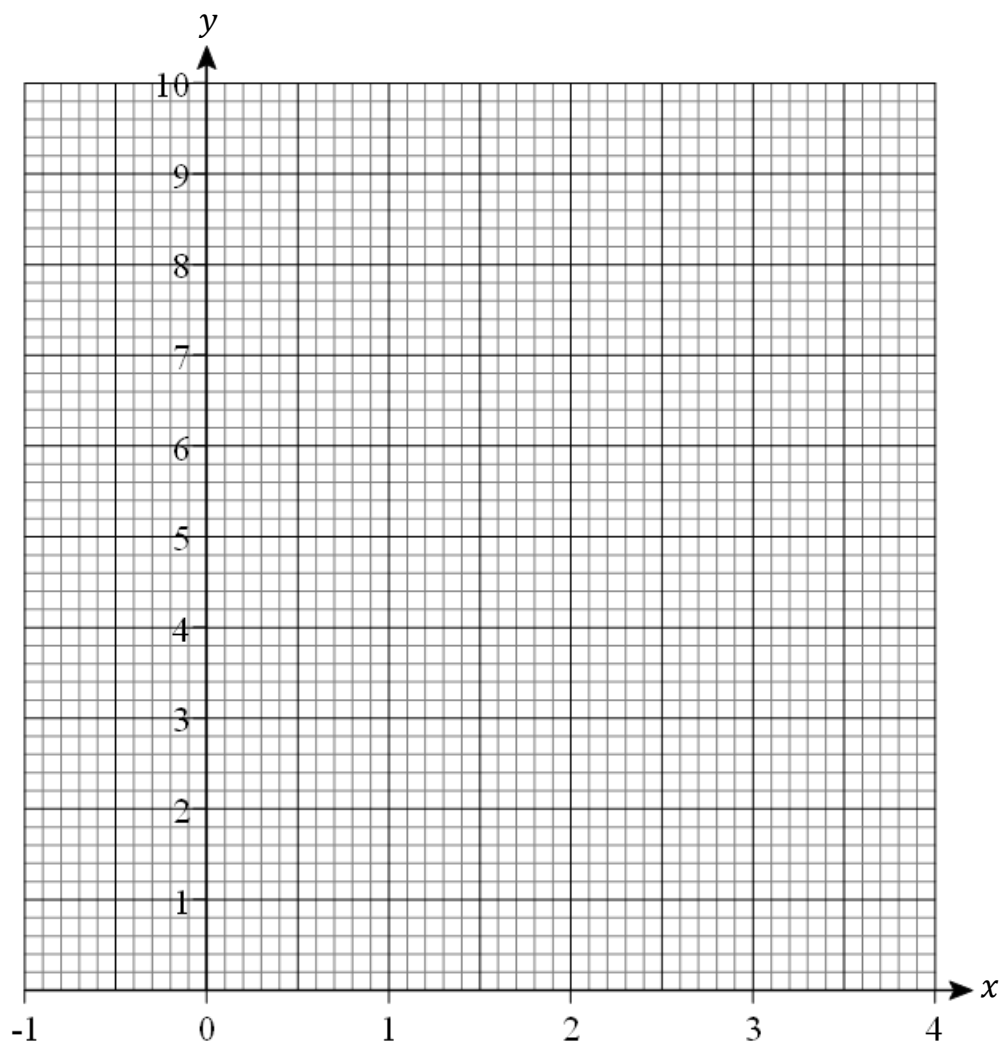

Diagram not drawn to scale

Ans: _____

(6 marks)

14. (a) Complete the table below for the graph $y = x^2 - 4x + 5$ for values of x from -1 to 4.

x	-1	0	1	2	3	4
x^2		0	1	4	9	
$-4x$		0	-4	-8	-12	
$+5$		5	5	5	5	
y		5	2	1	2	

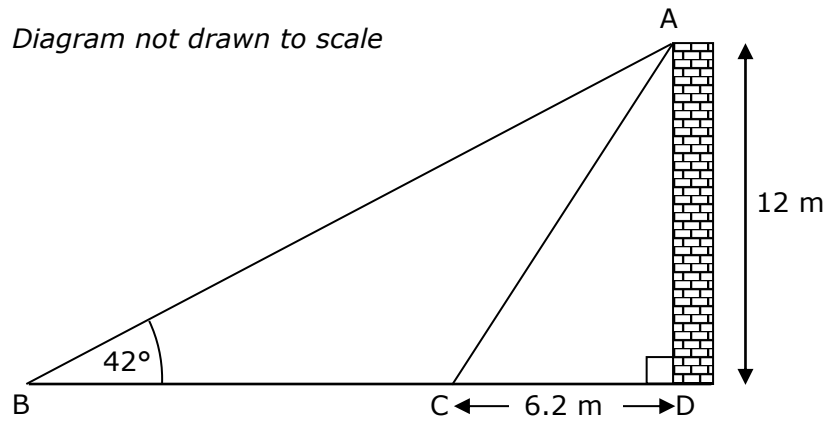(b) Plot the graph and join the coordinates to form a smooth curve.

(c) What is the value of y when $x = 2.5$?

Ans: _____

(6 marks)

15. The diagram shows two cables AB and AC, fixed to a point A at the top of a wall AD. Points B, C and D lie on level ground. The wall AD is 12 m high, and CD is 6.2 m. Angle ABC is 42°.

Diagram not drawn to scale

A

12 m

42°

B

C ← 6.2 m → D

(a) Calculate the value of angle ACD.

Ans: _____

(b) Work out the length of cable AC.
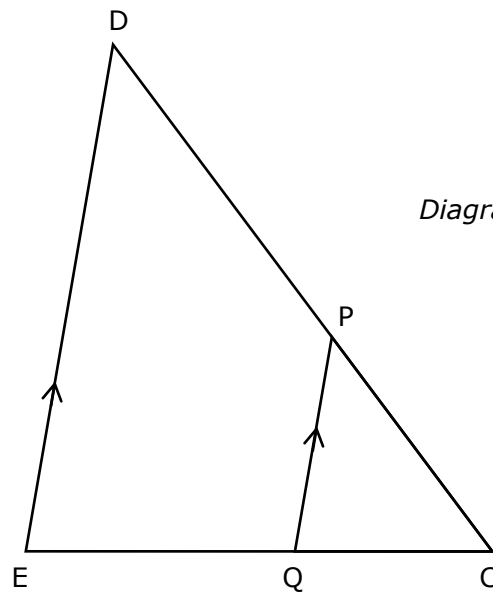
Ans: _____

(c) Calculate the distance BC, correct to one decimal place.

Ans: _____

(7 marks)

16. P and Q are points on the sides CD and CE respectively of a triangle CDE, such that PQ is parallel to DE.

D

Diagram not drawn to scale

P

E   Q   C

(a) Show that triangle CPQ and triangle CDE are similar, giving reasons.

(b) If CE = 21.5 cm, CQ = 8.6 cm and CP = 9.2 cm, calculate CD.

Ans: _____

(6 marks)

End of Paper

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