



Index Number:

NATIONAL CERTIFICATE OF EDUCATION

2021-2022

MATHEMATICS (N510)

TIME: 2 HOURS

Candidates answer on the Question Paper.

Additional Materials: Geometrical Instruments

READ THESE INSTRUCTIONS FIRST

1. Write your index number in the space provided above.
2. Write in dark blue or black ink.
3. You may use an HB pencil for diagrams. Do not use correction fluid.
4. Diagrams are not drawn to scale unless otherwise specified.
5. Answer **ALL** questions.
6. All workings should be shown in the spaces provided.
7. This document consists of **31** questions printed on **24** pages, numbered **2** to **25**.
8. **CALCULATORS MUST NOT BE USED FOR THIS PAPER.**
9. The number of marks is given in brackets [] at the end of each question or part question.
10. The total number of marks for this paper is **100**.

For Examiners' use														
Page No.	3	5	7	9	11	13	15	17	19	21	23	25	Total	Signature
Examiner														
Team Leader														
Quality Controller														
CE/ACE														

1. Work out:

$$\begin{array}{r} 235 \\ + 451 \\ \hline \\ \hline \end{array}$$

Answer: [1]

2. Evaluate:

$$\frac{6}{7} - \frac{2}{7}$$

Answer: [1]

3. Convert 3 km 250 m into metres.

Answer: m [1]

4. Find $\sqrt{36}$.

Answer: [1]

5. Evaluate:

$- 5 - 7$

Answer: [1]

6. Express 0.25 as a percentage.

Answer: [1]

7. Simplify $x^6 \div x^4$.

Answer: [1]

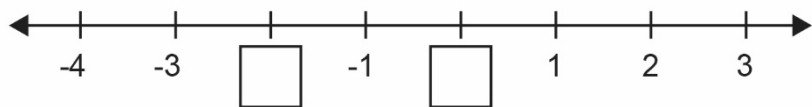
8. Simplify $5ab - 4ab$.

Answer: [1]

9. Find the Highest Common Factor (H.C.F.) of $2y^2$ and y .

Answer: [1]

10. Complete the number line below.



[1]

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11. Circle the correct answer. Each item carries 1 mark.

(a) $1.2 \times 4 =$

A 0.46

B 0.48

C 4.6

D 4.8

(b) How many sides does a **pentagon** have?

A 5

B 6

C 7

D 8

(c) Given that $A = \begin{pmatrix} 2 & 3 \\ 5 & -1 \\ 0 & 4 \end{pmatrix}$.

What is the order of matrix A?

A 2×3

B 3×3

C 2×2

D 3×2

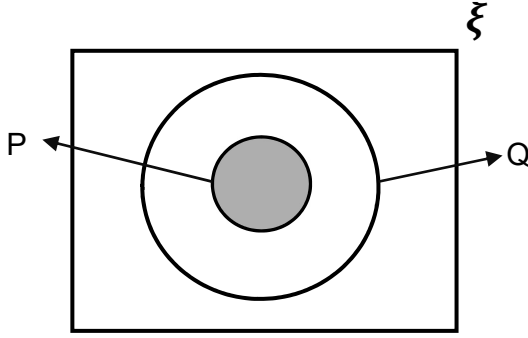
(d) What is the Lowest Common Multiple (L.C.M.) of 3 and 6?

A 3

B 6

C 9

D 18

- (e) What is the value of 73.058 correct to 1 decimal place?
- A** 73.0
B 73.1
C 73.10
D 73.05
- (f) How is an angle between 90° and 180° called?
- A** An acute angle
B A right angle
C An obtuse angle
D A reflex angle
- (g) If $52 \times 148 = 7696$, then $51 \times 148 =$
- A** $7696 - 148$
B $7696 + 148$
C $7696 - 52$
D $7696 + 52$
- (h) Study the Venn diagram below.
- Which one of the following statements is **true**?
- 
- A** $P \in Q$
B $Q = P$
C $Q \subset P$
D $P \subset Q$

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- (i) A rectangle has an area of 45 cm^2 and a width of 3 cm.

What is its length?

- A** 14 cm
- B** 15 cm
- C** 105 cm
- D** 135 cm

- (j) The cost of 6 pencils is Rs 90.

What is the cost of 3 pencils?

- A** 15
- B** 30
- C** 45
- D** 60

12. (a) What is the coefficient of x in the expression $8x^2 + 3x - 5$?

Answer: [1]

- (b) Factorise:

$$x^2 - 9$$

Answer: [1]

- (c) Find the value of $10 - 5 + \frac{3}{6}$. Give your answer as a **decimal**.

Answer: [2]

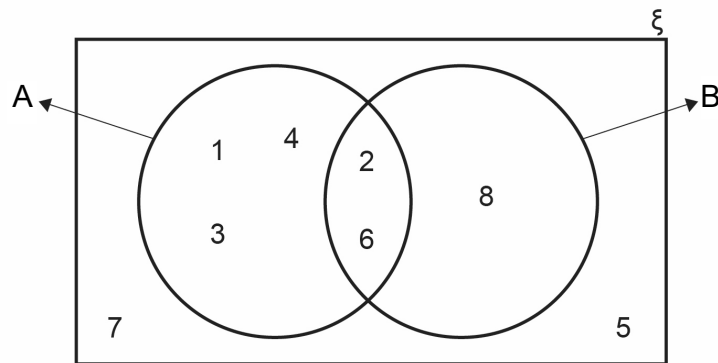
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13. Study the Venn diagram below carefully.



(a) List the elements of set

(i) A,

Answer: $A = \{\dots\dots\dots\}$ [1]

(ii) $A \cup B$.

Answer: $A \cup B = \{\dots\dots\dots\}$ [1]

(b) Write down $n(A' \cap B)$.

Answer: $\dots\dots\dots$ [1]

14. Solve the inequality $2 - 5x < 12$.

Answer: [3]

15. Mauritius is 4 hours ahead of GMT.
Chicago is 6 hours behind GMT.
When it is 03 30 in Chicago, what time is it in Mauritius?

Answer: [2]

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16. Solve $2^x = 16$.

Answer: $x = \dots\dots\dots$ [2]

17. The two vectors $\begin{pmatrix} 5 \\ m+n \end{pmatrix}$ and $\begin{pmatrix} m \\ 6 \end{pmatrix}$ are equal.

(a) State the value of m .

Answer: $m = \dots\dots\dots$ [1]

(b) Find the value of n .

Answer: $n = \dots\dots\dots$ [2]

18. Figure 1 shows a square card with **area** 25 cm^2 .



Figure 1

Six such cards are used to make the shape shown in Figure 2.

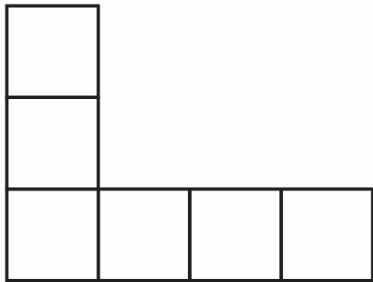


Figure 2

Find the **perimeter** of the shape shown in Figure 2.

Answer:cm [3]

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19. (a) A bag contains 6 black marbles and 4 white marbles.
A marble is chosen at random.

Find the probability that the marble is **not** white.

Answer: [2]

- (b) Two fair coins are tossed at the same time.
A possibility diagram is drawn to display all the possible outcomes.

- (i) Complete the possibility diagram given below.

		Coin 2	
		Head (H)	Tail (T)
Coin 1	Head (H)		
	Tail (T)	(T, H)	

[1]

- (ii) Find the probability that the coins show a head and a tail.
Give your answer in its **simplest form**.

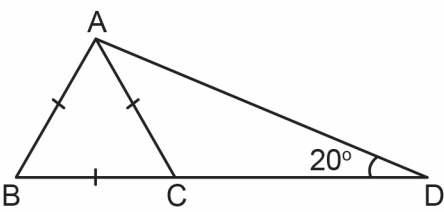
Answer: [2]

20. (a) Find the size of one angle in an **equilateral** triangle.

Answer: [1]

(b) Study the diagram below.

C is a point on BD such that triangle ABC is equilateral and $\angle ADC = 20^\circ$.



Find $\angle CAD$.

Answer: [3]

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21. Given that:

$$\mathbf{S} = \begin{pmatrix} 4 & -2 \\ 6 & 0 \end{pmatrix}$$

$$\mathbf{T} = \begin{pmatrix} -1 & 5 \\ 3 & 2 \end{pmatrix}$$

Find

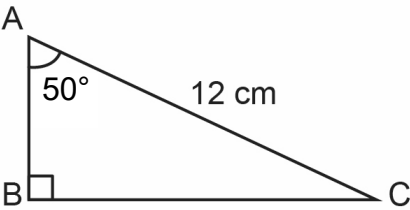
(a) $\frac{1}{2} \mathbf{S}$

Answer: [2]

(b) \mathbf{ST}

Answer: [3]

22. In triangle ABC below, $\angle ABC = 90^\circ$, $\angle BAC = 50^\circ$ and $AC = 12$ cm.



Using the information given below, as necessary, calculate the length of AB.
Give your answer to the **nearest whole number**.

$[\sin 50^\circ = 0.77 \qquad \cos 50^\circ = 0.64 \qquad \tan 50^\circ = 1.19]$

Answer: cm [3]

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23. The second and the third terms of a Fibonacci sequence are $2\frac{1}{3}$ and 3 respectively.

Find

- (a) the first term of the sequence,

Answer: [1]

- (b) the fourth term of the sequence.

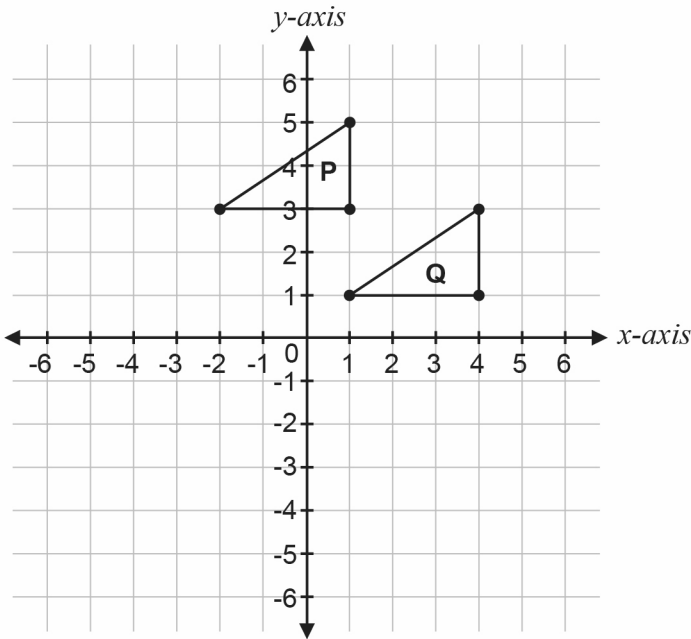
Answer: [1]

24. Triangle **P** and triangle **Q** are shown in the grid below.

On the same grid,

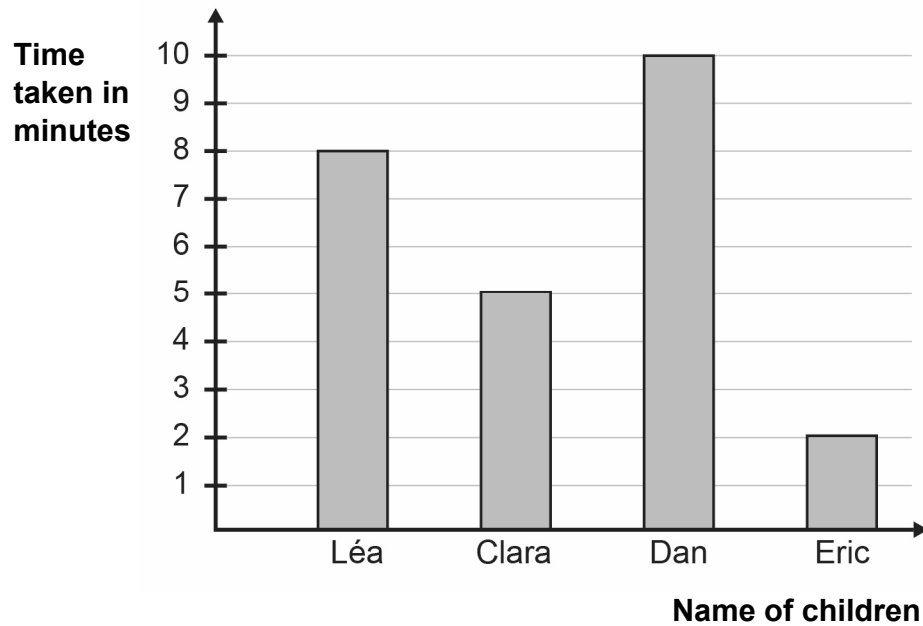
- (a) draw the image of triangle **P** under a **reflection** in the x -axis and label it **R**. [2]
- (b) write down the **translation vector** that maps triangle **P** onto triangle **Q**.

Answer: [1]



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25. (a) The bar chart below shows the time taken by 4 children to complete a task.



Who completed the task **first**?

Answer: [1]

- (b) The numbers below are listed in ascending order.

10 11 11 12 13 14 15 17

Find the median.

Answer: [2]

- (c) 20 families were asked about the number of pets they have.
The information gathered is shown in the frequency table below.

Number of pets (x)	0	1	2	3	4	5
Number of families (f)	4	7	4	1	3	1

Find the mean number of pets that a family has.

Answer: [2]

26. In a sale, the price of all items is reduced by 20%.
A refrigerator is sold at Rs 40 000 in the sale.

What was the original price of the refrigerator?

Answer: Rs [3]

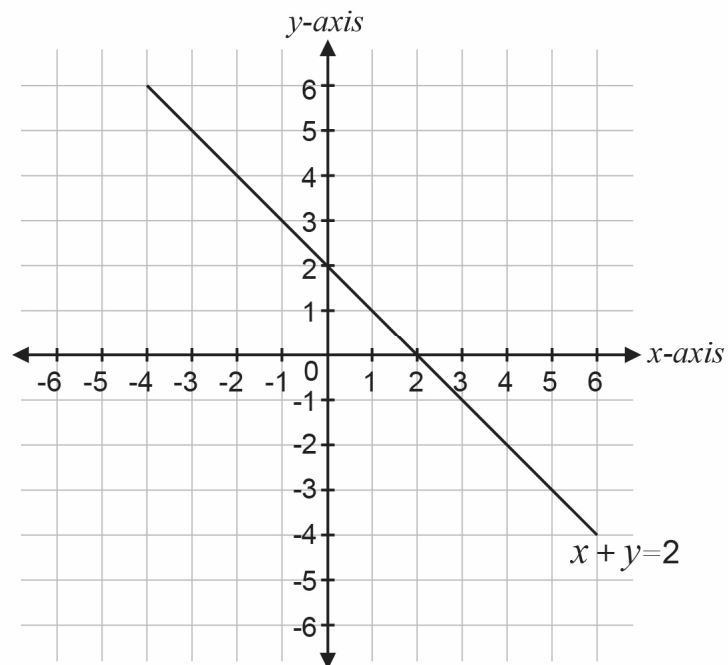
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27. (a) Complete the table of values for the line $y = 2x - 1$.

x	-2	0	2
y	-5	3
(x, y)	$(-2, -5)$	$(.....,)$	$(2, 3)$

[2]

- (b) The line $x + y = 2$ is shown on the grid below.
Using part (a), draw the line $y = 2x - 1$ on the same grid.



[2]

(c) **Hence**, or **otherwise**, solve the simultaneous equations:

$$x + y = 2$$

$$y = 2x - 1$$

Answer: $x = \dots\dots\dots$ $y = \dots\dots\dots$ [2]

28. Point A has coordinates (2, 3) and point B has coordinates (4, -1).

(a) Find the gradient of the line passing through A and B.

Answer: $\dots\dots\dots$ [2]

(b) **Hence**, find the equation of the line passing through A and B.

Answer: $\dots\dots\dots$ [3]

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29. A car travels a distance of 180 km from Town A to Town B at an average speed of 72 km/h.
Find the time taken by the car to travel from Town A to Town B.
Give your answer in hours and minutes.

Answer: h minutes [3]

30. (a) Expand $x(x + 1)$.

Answer: [1]

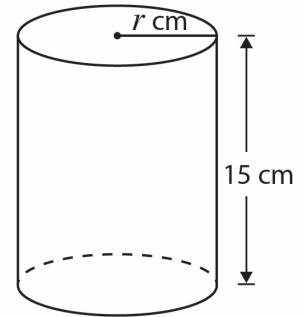
(b) Use your answer to part (a) to solve
 $x(x + 1) - 18 = 2$.

Answer: $x = \dots\dots\dots$ or $x = \dots\dots\dots$ [4]

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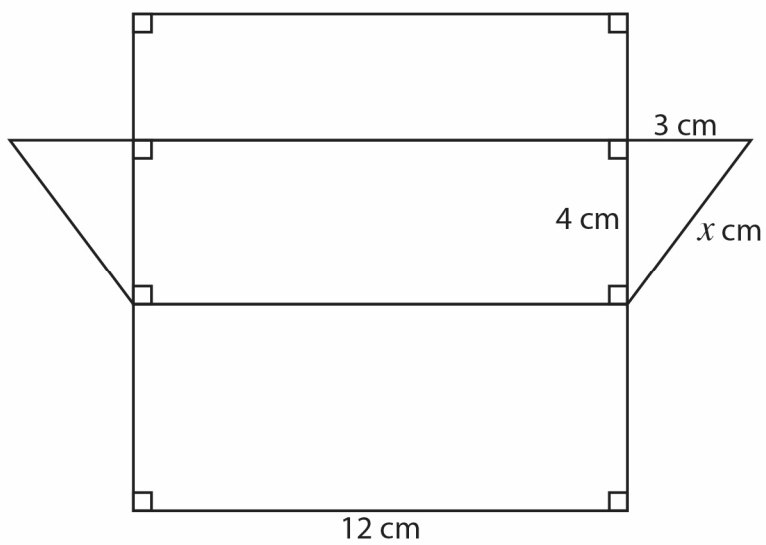
31. (a) A solid cylinder with height 15 cm and radius r cm has a volume of $735\pi \text{ cm}^3$.

Find the value of r .



Answer: cm [3]

- (b) The diagram below shows the net of a right prism.



Calculate

(i) the value of x ,

Answer: $x = \dots\dots\dots$ [2]

(ii) the total surface area of the prism,

Answer: $\dots\dots\dots \text{cm}^2$ [4]

(iii) the volume of the prism.

Answer: $\dots\dots\dots \text{cm}^3$ [2]

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