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Grade 10

MATHEMATICS I

2 hours

Part A

Answer all questions

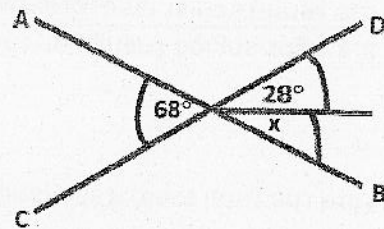
1. Find a suitable value for $\sqrt{12}$ to first approximation.

$$3.4^2 = 1.1 \cdot 56, 3.5^2 = 12.25$$

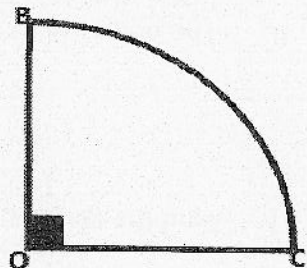
2. The price of 8 coconuts is Rs 1760. Find the price of 3 coconuts.

3. Factorize. $81 - x^2$

4. Using the information given in the figure find the value of x



5. The perimeter of the given sector is 36cm, and the arc length is 22cm. Find the radius of the sector.



6. Simplify.

$$\frac{3x^2 \times 5x^3}{10x^4}$$



7. Put a "√" in front of correct statements and a "×" in front of incorrect statements.

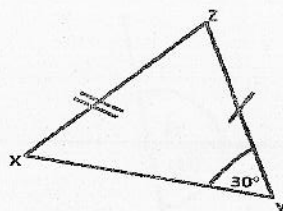
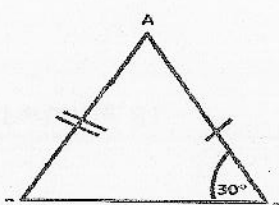
- I. "The letters in the English alphabet" is an infinite ^{set} ()
- II. 8 subsets can be written from a set with 3 elements. ()
- III. The even prime numbers between 5 and 20 are a null set. ()

8. Find the least common multiple of 15, 24, 30

9. Simplify. $\frac{2x}{(x-2)} - \frac{(x+2)}{(x-2)}$

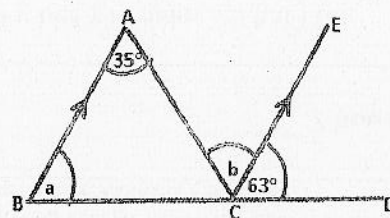
10. The value of the land is Rs 2500000. A broker charges Rs 125000 commission to sell the land. Find the commission percentage.

11. Are the two triangles given below congruent? Write the case of congruence.



12. $2x - 3 < 7$ Solve the given inequality and write two positive integers that satisfy the inequality.

13. Find the values of a and b, using the information in the figure.



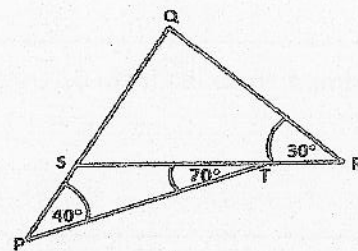
14. The number of chillies plucked from 9 chili plants is given below. Find the median of the collection.
13,14,12,8,6,9,13,10,8

15. Solve $\frac{x}{3} - 1 = 3$

16. There are 3 yellow buttons, 5 red buttons, and 2 blue buttons in a bag. Those are identical. Find the probability of getting a red colour button or a yellow colour button when a button is taken out randomly.

17. If $(a + b) = 7$, $ab = 20$, find the value of $a^2 + b^2$.

18. Find the value of $\angle SQR$, using the information given in the figure

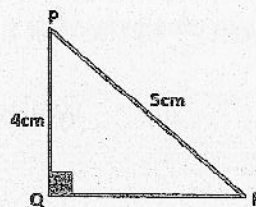


19. The equation of a straight line is $2y = 4x + 6$. Find the gradient and the intercept.

20. Fill in the blanks, using the suitable words.

The sum of a pair of, when a pair of straight lines is intersected by a transversal, is

21. Find the length of QR using the information given in the figure.

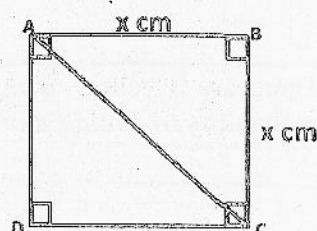


22. If -9 is a factor of $18x - 45$, find the other factor.

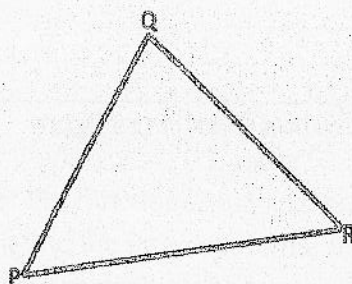
23. Find the 20th term in the number pattern where the general term is $2n + 3$.

24. Find the area of the square.

The length of the diagonal ABCD square is x cm.
Find the area of the square.



25. Using the knowledge on loci and construction, mark point A on the side PR and which moves equidistant to the sides PQ and QR



Part B

Answer all questions

1. A man travelled $\frac{1}{3}$ of the journey by bus and $\frac{1}{2}$ of the journey by train.
i) Which fraction of the journey did the man travel by bus and train?

- ii) Which fraction of the journey remains after travelling by bus and train?

He went $\frac{2}{3}$ of the rest of the journey by three-wheeler, and finally he walked the remaining distance of the journey.

- iii) Which fraction of the journey went in the three-wheeler?

iv) If the distance that he walked is 2km, find the total distance of the journey.

v) Find the ratio between distances travelled by train and by bus.

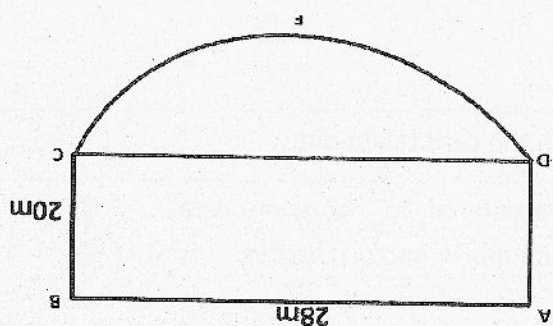
1. The figure below consists of ABCD rectangular land and DEC semi-circular land.

i. Find the length of the boundary DEC.

ii. The poles are located along the DEC boundary in 4m distance. Find the number of poles located

iii. Find the total area of the land.

iv. If a right-angled triangular-shaped land with DC side as the base is attached to the land instead of the semi-circular land, draw with measurements the right-angled triangle on the above diagram.



2. It is estimated that 8 men need 10 days to finish building a wall.

i. How many mandays are needed for the task?

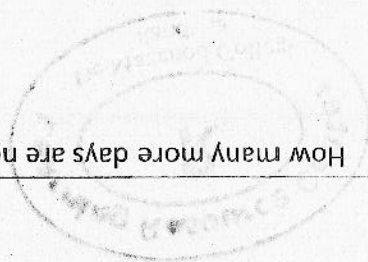
ii. How many mandays are needed to complete the $\frac{3}{4}$ of the wall?

iii. How many days are needed to complete $\frac{3}{4}$ of the wall by 10 men?

After working in first 6 days, 6 out of 10 men left the work.

iv. How many days will be taken by the remaining men to complete the rest of the wall?

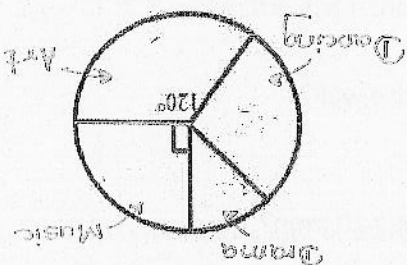
V. How many more days are needed to complete the wall than estimated number of days?



4. The given pie chart below shows that the number of students in grade 10 in a certain school who selected the subjects in category II. The number of students who selected music is 60.

I. Write as a percentage the number of students who do music out of the total number.

II. Find the total number of students in grade 10.



III. If the number of students who do dancing is twice the number of students who do drama and theatre, find the sector angles of the remaining sectors in the pie chart.

IV. If 10 students who do Arts decided to do dancing, find the new sector angle of the number of students who do dancing in the pie chart.

5. (a) Consider the event that a card is taken out of a bag randomly, which contains 10 identical cards numbered from 1 to 10.

I. Write the sample space of the above experiment.

II. Write the probability of getting an even number on the card taken out.

III. Write the probability of getting a prime number.

IV. Write the probability of getting a multiple of 12.

V. If A is an event in the sample space and its probability is $0.1 \{P(A) = 0.1\}$, give two examples for the event A from the above sample space.

05. a. A scale diagram is drawn to the scale of 1 : 20000. Find the scale length in the scale diagram used to represent 2km

b. The locations of the three places A, B, and C are given below.

- ❖ B is located 50 km away due West of A
- ❖ The bearing of C from B is 210° and the distance between B and C is 40km.

- i. Draw a rough sketch using the above data.
- ii. Draw a scale diagram, taking scale 1cm represents 5km.
Using the scale diagram,
- iii. Find the actual distance between A and C.
- iv. Find the bearing of A from C

06. The number of leaves that have been taken by employees of a certain company is given below in the table.

Number of days of leave (x)	Number of employees (f)	fx
1 days	5	
2 days	12	
3 days	14	
4 days	10	
5 days	5	
6 days	4	
	$\Sigma f =$	$\Sigma fx =$

- i. Find the mode and median of the distribution.
- ii. Copy the table and complete.
- iii. Find the mean number of leaves that have been taken by an employee to nearest whole number.
- iv. If Rs. 1500 is granted to the employees who have taken leave less than the mean number at the end of the month, find the amount that the company has to spend.

Part B

07. The first three terms of a number pattern are 7, 13, 19,.....

- i. Write the general term of the above number pattern.
- ii. Find the 15th term of the number pattern.
- iii. Which term is 55 in the number pattern?
- iv. Is 128 a term of the above number pattern?
- v. Find $(n - 1)$ th term.

08. Construct using the straight edge and a pair of compasses.

- i. Construct the triangle ABC, $AB = 8$ cm, $\hat{A}BC = 120^\circ$ and $BC = 6.2$ cm.
- ii. Construct the perpendicular bisector of AB.
- iii. Construct the angle bisector of $\hat{A}BC$ and name the intersection point of the perpendicular bisector and angle bisector as O.
- iv. Name the foot of the perpendicular drawn to BC from O as X.
- v. Find the area of the triangle OXB.

09. (a) Find the value.

$$(2^4)^2 + 2^0$$

(b) The length, breadth, and height of the cuboidal shaped container are 1.2 m, 2m and 0.5 m respectively.

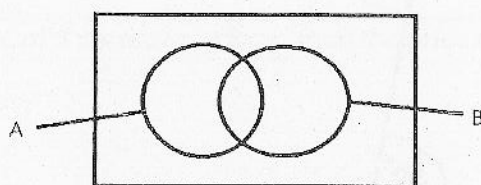
I. Find the capacity of the tank in litres.

The height of another container which the capacity is twice the capacity of the above container and has the square base is 0.6m.

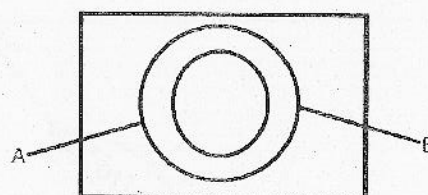
II. Find the base area of the above container.

III. Hence find the length of the side of the above container which has the square base.

10. a. Copy the Venn diagrams and shade the region given below.



$A \cup B$



$A \cap B$

b. $\varepsilon = \{ \text{The letters in the English alphabet from A to O} \}$

$P = \{ \text{The letters in the word "BALOON"} \}$

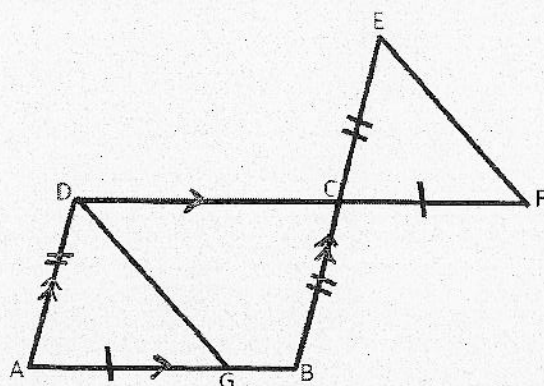
$Q = \{ \text{The vowels in the English alphabet} \}$

- List the elements in each set.
- Copy the Venn diagram and include the elements in it.
- Using the Venn diagram, list elements of the sets given below.
 - $P \cup Q$
 - P^c



11. (a) Write the 4 cases of the congruency of triangles in words.

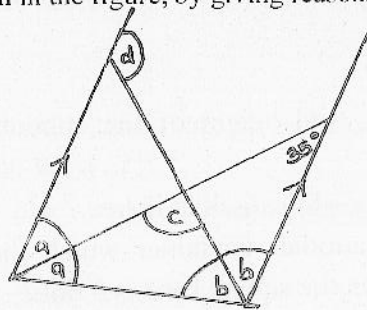
(b) ABCD is a parallelogram. Point G is located on the side AB. DC side is produced to F such that $CF = AG$. BC side is produced to E such that $BC = CE$. Copy the diagram given below.



- Show that $\triangle AGD \cong \triangle CEF$.
- Show that $\angle AGD = \angle CFE$.
- Show that $GD \parallel EF$.

12. a) According to the information given in the figure, by giving reasons, find

- the value of a
- the value of $2a + 2b$
- The values of b, c , and d



b) Find the value of x and y with reasons by using the information given in the figure.

