

GREENLAWNS SCHOOL, WORLI
First Semester Examination 2024-25
Mathematics

STD: VII

Date: 15/09/2025

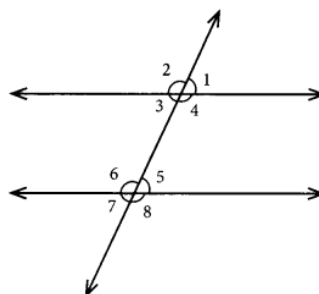
Marks: 80

Time: 2½ hr

Question 1 MCQ

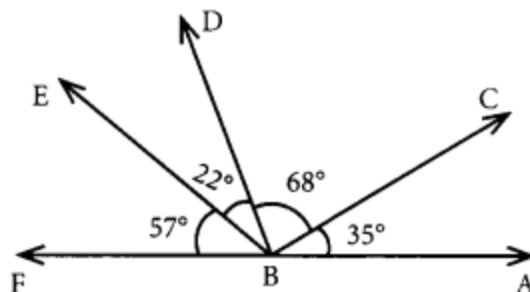
- i. $(-2)^3 \times (-3)^2$ is equal to
(a) 6^5 (b) $(-6)^6$ (c) 72 (d) -72
- ii. The value of $(5^{30} \times 5^{20}) \div (5^5)^9$ in the exponential form is
(a) 5^{-5} (b) 5^5 (c) 5^{50} (d) 5^{95}
- iii. If $2^3 + 1^3 = 3^x$, then the value of x is
(a) 0 (b) 1 (c) 2 (d) 3
- iv. Which of the following collection forms a set?
(a) Collection of 5 odd prime numbers
(b) Collection of 3 most intelligent students of your class
(c) Collection of 4 vowels of the English alphabet
(d) Collection of first 6 months of a year.
- v. The symbol $\leftrightarrow$ stands for
(a) belongs to (b) is a subset of (c) is equivalent to (d) none of these
- vi. The value of $5 \div (-1)$ does not lie between
(a) 0 and -10 (b) 0 and 10 (c) -3 and -10 (d) -7 and 7
- vii. Closure property does not hold in integers for
(a) multiplication (b) division (c) addition (d) subtraction
- viii. The fraction $\frac{1}{17}$ lies between
(a) 11 and 7 (b) 1 and 2 (c) 0 and 1 (d) 2 and 3
- ix. The rational number $\frac{110}{-132}$ when reduced to standard form is
(a) $\frac{10}{-12}$ (b) $\frac{5}{-6}$ (c) $\frac{-5}{6}$ (d) $\frac{110}{-132}$
- x. Which of the following is false

- (a) $\angle 1 = \angle 2$
(b) $\angle 2 = \angle 4$
(c) $\angle 2 + \angle 3 = 180^\circ$
(d) $\angle 3 + \angle 4 = 180^\circ$



xi. Which angle is complementary to $\angle CBD$?

- (a) $\angle FBC$
- (b) $\angle EBF$
- (c) $\angle ABC$
- (d) $\angle DBE$



xii. The ratio between two numbers is 2 : 11. If the difference between the numbers is 81 find the smaller number.

- (a) 10
- (b) 12
- (c) 16
- (d) 18

xiii. The mean of first 5 prime numbers is

- (a) 3.8
- (b) 4.4
- (c) 5.6
- (d) 7.2

xiv. The following data has been arranged in ascending order. The median of the data is 15 then find the value of x.

8, 11, 12, x + 6, 17, 18, 23

- (a) 15
- (b) 9
- (c) 11
- (d) 5

xv. The number of trees in different parks of a city are 33, 38, 48, 33, 34, 34, 33 and 24. The mode of this data is

- (a) 24
- (b) 34
- (c) 33
- (d) 48

Question 2

a. One of the acute angles of a right-angled triangle is 50° . Find the other acute angle. [2]

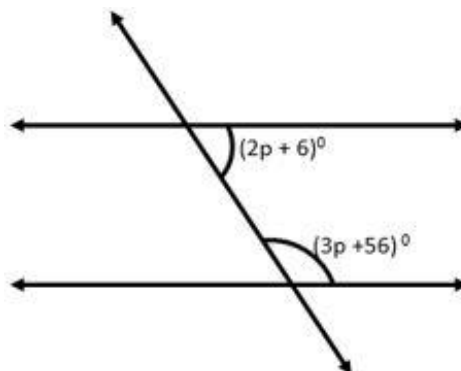
b. Find the angle which is equal to its complement. [2]

c. The value of $(6^{-1} - 8^{-1})^{-1}$ is [2]

d. A rectangular park is 120 m long and 75 m wide. Find the ratio of: length to its perimeter. [2]

e. The weights of Diya and Viya are in the ratio of 5: 7. If Viya weighs 48 kg, find the weight of Diya. [2]

f. In the given diagram a pair of parallel lines are cut by a transversal. Find the value of 'p'. [2]



g. Write the following sets in set builder form: [3]

(i) $\{-14, -7, 0, 7, 14, 21, 28\}$

(ii) $\{1, 2, 3, 6, 9, 18\}$

Question 3

- a. Write all the subsets of the following sets:

(i) Φ

(ii) $\{3, 5\}$

[2]

- b. Simplify: $8.2 - 4.56 - 0.7912 + 2.67$

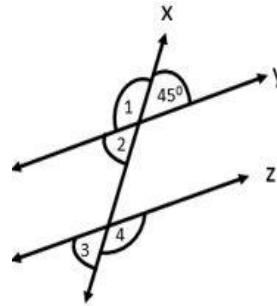
[2]

- c. Arrange the following rational numbers in ascending order:

[3]

$$\frac{-25}{6}, \frac{15}{-4}, \frac{-17}{8}, \frac{-53}{12}$$

- d. In the below provided diagram $y \parallel z$. Find the measure of all the marked angles.



[3]

Question 4

- a. The first three terms of a proportion are 2, 5, and 32 respectively. Find the fourth term.

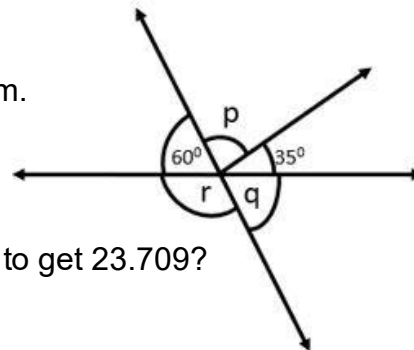
[2]

- b. Ratio of boys and girls in a school is 3 : 5. If there are 120 boys in the school, then find out the girl's strength.

[2]

- c. Find the value of p, q and r in the below diagram.

[3]



- d. (i) What number added to 3.56 gives 13.016?

(ii) What number should be subtracted from 30 to get 23.709?

(iii) What is the excess of 20.4 over 9.7403?

[3]

Question 5

- a. Simplify the following: $\frac{7^3 \times 11^4 \times 13^0}{7^2 \times 11^2}$

[2]

- b. Write the following sets in roster form

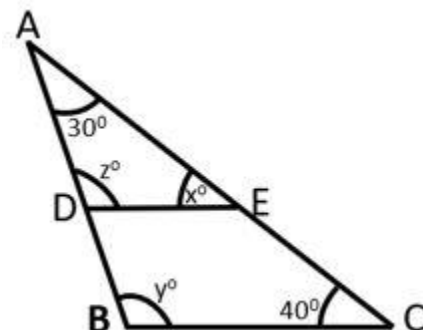
(i) $\{x : x = 5n, n \in \mathbb{I} \text{ and } -3 < n \leq 13\}$

(ii) $\{x : x = n^2 - 2, n \in \mathbb{W} \text{ and } n < 4\}$

[2]

- c. In below given figure $DE \parallel BC$, $\angle A = 30^\circ$, and $\angle C = 40^\circ$. Find the value of x, y and z.

[3]



- d. In a class of 56 students, $\frac{1}{4}$ are in blue house and $\frac{3}{14}$ are in yellow house. Out of the remaining, $\frac{1}{3}$ are in the greenhouse and the rest are in the red house. Find the number of students in each house.

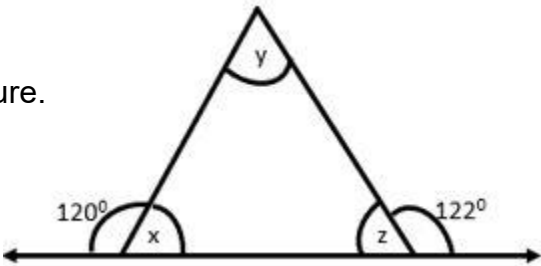
[3]

Question 6

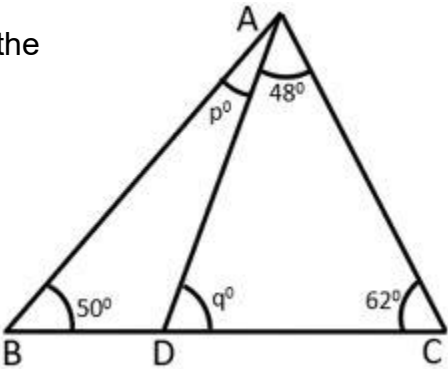
- a. 25 m long ladder reaches a roof of 20 m high from the ground on placing it against the wall. How far is the foot of the ladder from the wall? [3]
- b. Find the value of x in each of the following:
- (i) $7^x = 343$
- (ii) $3^x = 729$ [3]
- c. Simplify the following:
- (i) $(-7) + (-6) \div 2 - \{(-5) \times (-4) - (3 - 5)\}$
- (ii) $11 - [7 - (5 - 3(9 - 3 - 6^{-}))]$. [4]

Question 7

- a. Find the value of 'x', 'y', and 'z' in the given figure. [3]



- b. Find the value of 'p' and 'q' in the given figure. [3]



- c. The table given below shows the number of students playing four different games.

Games	Football	Hockey	Cricket	Badminton
Number of Students	200	150	100	50

Present this information by a bar graph. [4]

Answer key of midterm math exam answer key grade 7

Question 1 MCQ

- i. (d) -72
- ii. (b) 5^5
- iii. (c) 2
- iv. (b) Collection of 3 most intelligent students of your class.
- v. (c) is equivalent to
- vi. (b) 0 and 10
- vii. (b) division
- viii. (c) 0 and 1
- ix. (c) $\frac{-5}{6}$
- x. (a) $\angle 1 = \angle 2$
- xi. (d) $\angle DBE$
- xii. (d) 18
- xiii. (c) 5.6
- xiv. (b) 9
- xv. (c) 33

Question 2

- a. One of the acute angles of a right-angled triangle is 50° . Find the other acute angle. [2]

Sol. Let's assume the other acute angle is p° .
As we know, sum of all the angles of a triangle is 180° .
 $90^\circ + 50^\circ + p^\circ = 180^\circ$
 $\Rightarrow p^\circ = 180^\circ - 140^\circ$
 $\Rightarrow p^\circ = 40^\circ$
So, the third acute angle is 40° .

- b. Find the angle which is equal to its complement. [2]

Sol. Let's assume one of the two angles is 'p'.
Hence, $p + p = 90^\circ$
 $\Rightarrow 2p = 90^\circ$
 $\Rightarrow p = 90^\circ/2$
 $\Rightarrow p = 45^\circ$
So, 45° is the angle equal to its complement.

- c. The value of $(6^{-1} - 8^{-1})^{-1}$ is [2]
Solution:

$$\begin{aligned}(6^{-1} - 8^{-1})^{-1} &= \left(\frac{1}{6} - \frac{1}{8}\right)^{-1} \\ &= \left(\frac{4-3}{24}\right)^{-1} = \left(\frac{1}{24}\right)^{-1} = 24\end{aligned}$$

d. A rectangular park is 120 m long and 75 m wide. Find the ratio of: length to its perimeter.

[2]

Solution:

Length of park (l) = 120 m and width (b) = 75 m

Perimeter = $2(l + b) = 2(120 + 75) \text{ m} = 2 \times 195 = 390 \text{ m}$

Ratio between length to perimeter = $120 : 390 = 4 : 13$ (Dividing by 30)

e. The weights of Diya and Viya are in the ratio of 5: 7. If Viya weighs 48 kg, find the weight of Diya.

[2]

Solution:

Let the weight of Diya = x

Then the ratio of the weight of Divya and Viya will be $x : 28 \text{ kg}$

According to the given statement

$x : 28 :: 5 : 7$

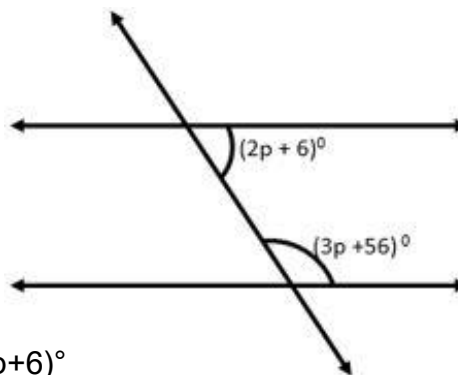
By cross product rule

Product of extremes = Product of means

$x \times 7 = (28 \times 5) \text{ kg}$

$x = 20 \text{ kg}$

Weight of Diya = 20 kg



f. In the given diagram a pair of parallel lines are cut by a transversal. Find the value of 'p'.

[2]

Sol. Supplementary angle of $(2p+6)^\circ = 180^\circ - (2p+6)^\circ$
 $= 180^\circ - 2p - 6^\circ$
 $= 176^\circ - 2p$

As we know, corresponding angles are same

$\Rightarrow 176^\circ - 2p = 3p + 56^\circ$

$\Rightarrow 5p = 176^\circ - 56^\circ$

$\Rightarrow 5p = 120^\circ$

$\Rightarrow p = \frac{120^\circ}{5}$

$\Rightarrow p = 24^\circ$

g. Write the following sets in set builder form:

(i) $\{-14, -7, 0, 7, 14, 21, 28\}$

(ii) $\{1, 2, 3, 6, 9, 18\}$

[3]

Solu:

(i) $\{x \mid x = 7n, n \in \mathbb{I} \text{ and } -2 \leq n \leq 4\}$ (set builder form)

(ii) Given set = $\{x \mid x \in \mathbb{N}, x \text{ is a factor of } 18\}$ (set builder form)

Question 3

a. Write all the subsets of the following sets:

(i) Φ

(ii) $\{3, 5\}$

[2]

Solution:

(i) Subset of Φ is Φ

(ii) Empty set is a subset of every set so, the subsets are $\Phi, \{3\}, \{5\}, \{3, 5\}$.

b. Simplify: $8.2 - 4.56 - 0.7912 + 2.67$

[2]

sol: $= 8.2000 - 4.5600 - 0.7912 + 2.6700$ (Converting into like decimals)

$= 8.2000 + 2.6700 - 4.5600 - 0.7912$

$= 10.8700 - 5.3512$

$= 5.5188$

c. Arrange the following rational numbers in ascending order:

[3]

Solution:

$$\frac{-25}{6}, \frac{15}{-4}, \frac{-17}{8}, \frac{-53}{12}$$

$$\frac{-25}{6}, \frac{15}{-4}, \frac{-17}{8}, \frac{-53}{12}$$

LCM of 6, 4, 8, 12 = 24

$$\frac{15}{-4} = \frac{15 \times (-6)}{-4 \times (-6)} = \frac{-90}{24}$$

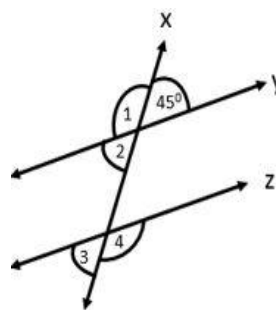
$$\frac{-17}{8} = \frac{-17 \times 3}{8 \times 3} = \frac{-51}{24}$$

$$\frac{-53}{12} = \frac{-53 \times 2}{12 \times 2} = \frac{-106}{24}$$

Arranging in ascending order,

$$\frac{-106}{24}, \frac{-90}{24}, \frac{-51}{24}, \frac{-25}{6}$$

$\Rightarrow \frac{-53}{12}, \frac{-25}{6}, \frac{15}{-4}, \frac{-17}{8}$ are in ascending order.



[3]

d. In the below provided diagram $y \parallel z$. Find the measure of all the marked angles.

Sol. Since 'y' and 'z' are parallel and a transversal 'x' meets them, therefore

$\angle 2 = 45^\circ$ (vertically opposite angles)

$\angle 2 = \angle 3 = 45^\circ$ (Corresponding angles)

$\angle 1 + 45^\circ = 180^\circ$ (Linear pair)

$\Rightarrow \angle 1 = 180^\circ - 45^\circ$

$\Rightarrow \angle 1 = 135^\circ$

$\angle 3 + \angle 4 = 180^\circ$

$\Rightarrow 45^\circ + \angle 4 = 180^\circ$ (Linear pair)

$$\Rightarrow \angle 4 = 180^\circ - 45^\circ$$

$$\Rightarrow \angle 4 = 135^\circ$$

Question 4

- a. The first three terms of a proportion are 2, 5, and 32 respectively. Find the fourth term.

Solution. Let's assume the fourth term to be 'y'.

$$\frac{2}{5} = \frac{32}{y}$$

$$\Rightarrow 2y = 32 \times 5$$

$$\Rightarrow y = \frac{32 \times 5}{2}$$

$$\Rightarrow y = 16 \times 5$$

$$\Rightarrow y = 80$$

So, the fourth number

[2]

- b. Ratio of the boys and girls in a school is 3 : 5. If there are 120 boys in the school, then find out the girls strength.

Solution. Let's assume total students in the school is 'm'.

$$\frac{3}{8} \times m = 120$$

$$\Rightarrow m = 120 \times \frac{8}{3}$$

$$\Rightarrow m = 40 \times 8$$

$$\Rightarrow m = 320$$

Number of students in the school is 320.

Number of girls in the school = $320 - 120 = 200$

- c. Find the value of p, q and r in the below diagram.

Solution. Here, $q = 60^\circ$ (vertically opposite angles)

As the sum of angles at a point on one side of a straight line is 180° .

$$\Rightarrow 60^\circ + p + 35^\circ = 180^\circ$$

$$\Rightarrow p = 180^\circ - 60^\circ - 35^\circ$$

$$\Rightarrow p = 85^\circ$$

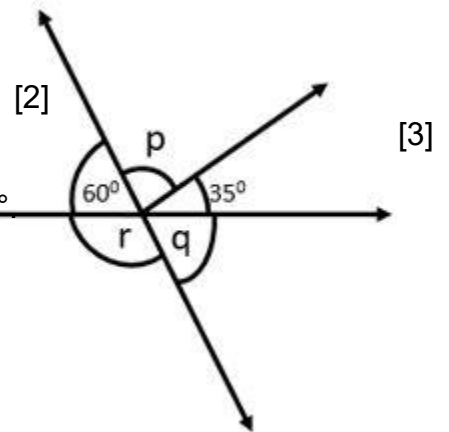
$$\Rightarrow r + q = 180^\circ$$

$$\Rightarrow r + 60^\circ = 180^\circ$$

$$\Rightarrow r = 180^\circ - 60^\circ$$

$$\Rightarrow r = 120^\circ$$

Hence, $p = 85^\circ$, $q = 60^\circ$, and $r = 120^\circ$.



- d. (i) What number added to 3.56 gives 13.016?
 (ii) What number should be subtracted from 30 to get 23.709?
 (iii) What is the excess of 20.4 over 9.7403?

[3]

Sol:

- (i) The required number = $13.016 - 3.56 = 13.016 - 3.560 = 9.456$

$$\begin{array}{r} 13.016 \\ - 3.560 \\ \hline 9.456 \end{array}$$

$$\begin{array}{r} 13.016 \\ - 3.560 \\ \hline 9.456 \end{array}$$

$$\begin{array}{r} 13.016 \\ - 3.560 \\ \hline 9.456 \end{array}$$

- (ii) The required number = $30 - 23.709 = 30.000 - 23.709 = 6.291$

$$\begin{array}{r} 30.000 \\ - 23.709 \\ \hline 6.291 \end{array}$$

$$\begin{array}{r} 30.000 \\ - 23.709 \\ \hline 6.291 \end{array}$$

$$\begin{array}{r} 30.000 \\ - 23.709 \\ \hline 6.291 \end{array}$$

(iii) The required number = $20.4 - 9.7403 = 20.4000 - 9.7403 = 10.6597$

$$\begin{array}{r} 20.4000 \\ - 9.7403 \\ \hline 10.6597 \end{array}$$

Question 5

a. Simplify the following: $\frac{7^3 \times 11^4 \times 13^0}{7^2 \times 11^2}$ [2]

b. (i) $\{x : x = 5n, n \in \mathbb{I} \text{ and } -3 < n \leq 13\}$
 (ii) $\{x : x = n^2 - 2, n \in \mathbb{W} \text{ and } n < 4\}$ [2]

Sol:

The set can be written as

(i) Integers lie between -2 and 3 are -2, -1, 0, 1, 2, 3.

Given $x = 5n$, putting $n = -2, -1, 0, 1, 2, 3$, we get

$$x = 5 \times -2, 5 \times -1, 5 \times 0, 5 \times 1, 5 \times 2, 5 \times 3,$$

$$= -10, -5, 0, 5, 10, 15$$

$$\text{Set} = \{-10, -5, 0, 5, 10, 15\}$$

(tabular form)

(ii)

Whole numbers less than 4 are 0, 1, 2, 3

Given $x = n^2 - 2$, putting $n = 0, 1, 2, 3$, We get

$$x = 0^2 - 2, 1^2 - 2, 2^2 - 2, 3^2 - 2$$

$$= -2, -1, 2, 7$$

$$\text{Given set} = \{-2, -1, 2, 7\} \text{ (roster form)}$$

c. In a class of 56 students, $\frac{1}{4}$ are in blue house and $\frac{3}{14}$ are in yellow house. Out of the remaining, $\frac{1}{3}$ are in the greenhouse and the rest are in the red house. Find the number of students in each house. [3]

Sol:

Number of total students of a class = 56

Number of students of blue house = $\frac{1}{4}$ of 56 = 14

Number of students of yellow house = $\frac{3}{14}$ of 56 = 12

Remaining students = $56 - (14 + 12) = 56 - 26 = 30$

Number of students of greenhouse = $\frac{1}{3}$ of 30 = 10

and remaining students who are of red house = $30 - 10 = 20$

d. In below given figure $DE \parallel BC$, $\angle A = 30^\circ$, and $\angle C = 40^\circ$. Find the value of x , y and z . [3]

Sol. In triangle ABC, we have $\angle A = 30^\circ$, and $\angle C = 40^\circ$

$$\angle A + \angle B + \angle C = 180^\circ$$

$$\Rightarrow 30^\circ + y^\circ + 40^\circ = 180^\circ$$

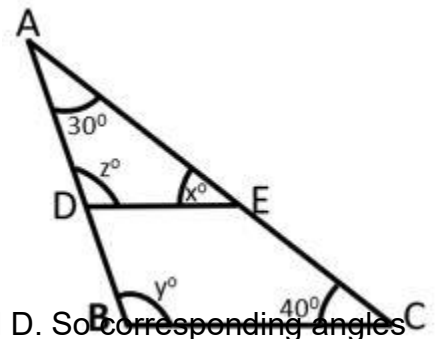
$$\Rightarrow y^\circ + 70^\circ = 180^\circ$$

$$\Rightarrow y^\circ = 110^\circ$$

Here, $DE \parallel BC$ and transversal AB intersect them at point B and D. So corresponding angles will be equal.

$$\angle B = \angle ADE$$

$$\Rightarrow y^\circ = z^\circ$$



$$\Rightarrow z^\circ = 110^\circ$$

Similarly, transversal AC intersect them at point E and C. So corresponding angles will be equal.

$$\angle AED = \angle C$$

$$\Rightarrow x^\circ = 40^\circ$$

Hence $x^\circ = 40^\circ$, $y^\circ = 110^\circ$ and $z^\circ = 110^\circ$ Write the following sets in roster form:

Question 6

- a. 25 m long ladder reaches a roof of 20 m high from the ground on placing it against the wall. How far is the foot of the ladder from the wall? [3]

Sol. Let's assume AB is the ladder, B is the roof and CB is the height of the wall and AC is the distance between wall and ladder.

$$AC^2 + BC^2 = AB^2$$

$$\Rightarrow BC^2 = AB^2 - AC^2$$

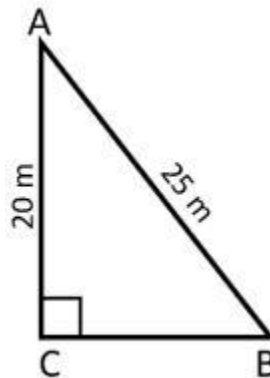
$$\Rightarrow BC^2 = 25^2 - 20^2$$

$$\Rightarrow BC^2 = 625 - 400$$

$$\Rightarrow BC = \sqrt{225}$$

$$\Rightarrow BC = 15 \text{ m}$$

Hence, the ladder is 15 m away from the wall.



- b. Find the value of x in each of the following:

(i) $7^x = 343$

(ii) $3^x = 729$

Sol:

(i) $7^x = 343$

$$= (7)^3 = 343$$

$$\begin{array}{r|l} 7 & 343 \\ \hline 7 & 49 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$$\therefore x = 3$$

(ii) $3^x = 729$

$$\begin{array}{r|l} 3 & 729 \\ \hline 3 & 243 \\ \hline 3 & 81 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$= 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 3^6$$

$$\therefore x = 6$$

- c. Simplify the following:

(i) $(-7) + (-6) \div 2 - \{(-5) \times (-4) - (3 - 5)\}$

(ii) $11 - [7 - (5 - 3(9 - 3 - 6))]$

Solution:

(i) $(-7) + (-6) \div 2 - \{(-5) \times (-4) - (3 - 5)\}$

$$= (-7) + (-6) \div 2 - [+20 - (-2)]$$

[4]

$$\begin{aligned}
&= (-7) + (-6) \div 2 - (20 + 2) \\
&= (-7) + -62 - 22 \\
&= (-7) + (-3) - 22 \\
&= -7 - 3 - 22 \\
&= -32 \\
\text{(ii) } &11 - [7 - (5 - 3(9 - 3 - 6))] \\
&= 11 - [7 - \{5 - 3(9 - 3 + 6)\}] \\
&= 11 - [7 - \{5 - 3 \times 12\}] \\
&= 11 - [7 - \{5 - 36\}] \\
&= 11 - [7 - \{-31\}] \\
&= 11 - [7 + 31] \\
&= 11 - 38 \\
&= -27
\end{aligned}$$

Question 7

a. Find the value of 'x', 'y', and 'z' in the given figure. [3]

Sol. Let's find out angle 'x' and 'z' using linear pair rule.

$$x + 120^\circ = 180^\circ$$

$$\Rightarrow x = 60^\circ$$

$$z + 122^\circ = 180^\circ$$

$$\Rightarrow z = 58^\circ$$

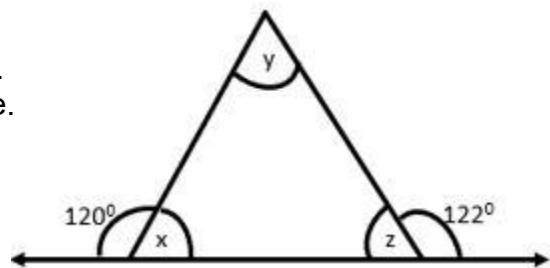
$$x + y + z = 180^\circ$$

$$\Rightarrow 60^\circ + y + 58^\circ = 180^\circ$$

$$\Rightarrow y = 180^\circ - 60^\circ - 58^\circ$$

$$\Rightarrow y = 62^\circ$$

$$\text{Hence, } x = 60^\circ, y = 62^\circ \text{ and } z = 58^\circ$$



b. Find the value of 'p' and 'q' in the below given figure. [3]

Sol. From the above figure we can see two triangles ABC and ADC.

Let's consider triangle ADC first.

$$q^\circ + 48^\circ + 62^\circ = 180^\circ$$

$$\Rightarrow q^\circ = 180^\circ - 110^\circ$$

$$\Rightarrow q^\circ = 70^\circ$$

Now consider, triangle ABC.

$$\angle ABC + \angle BAC + \angle ACB = 180^\circ$$

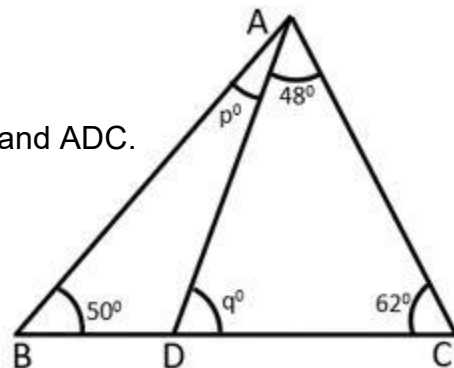
$$\Rightarrow 50^\circ + p^\circ + 48^\circ + 62^\circ = 180^\circ$$

$$\Rightarrow p^\circ + 160^\circ = 180^\circ$$

$$\Rightarrow p^\circ = 180^\circ - 160^\circ$$

$$\Rightarrow p^\circ = 20^\circ$$

$$\text{Hence, } p^\circ = 20^\circ \text{ and } q^\circ = 70^\circ.$$



c. The table given below shows the number of students playing four different games.

Games	Football	Hockey	Cricket	Badminton
Number of Students	200	150	100	50

Present this information by a bar graph.

[4]
