MATH SSE, SESE SOLVED MCQ,S

PART 2 OF 3

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Chapter-3

INEQUALITY

An inequality, or inequation is a statement which involves one of the sign below:

$<$	Less than
$\leq$	Less than or equal to
$>$	Greater than
$\geq$	Greater than or equal to

eXamples

$$6x > 52$$
$$11y \geq -101$$
$$3x < 8$$
$$52w \leq 9$$

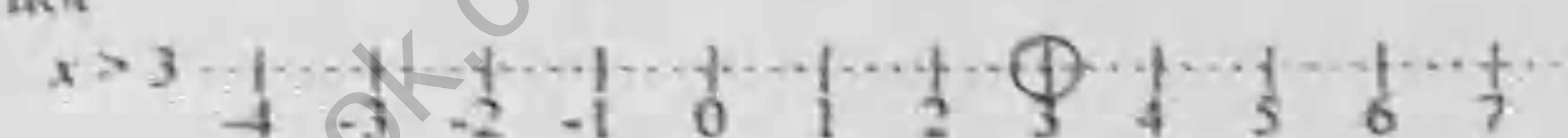
The set of all solutions of an inequality is called the solution set of the inequality. For example the solution of $x + 3 > 5$ is the set of all real numbers greater than 2.

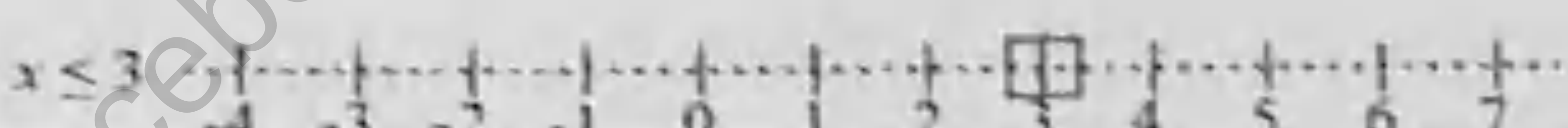
Note:
Equivalent Inequalities have the same solution set.

Representation of Inequality on number line:

Inequalities such as $x > 3$ or $x \leq 3$ can be represented on number line.

In following number line a circle "☐" shows that x is included and a rectangle "O" shows that it is not





Note:

1. Any quantity x is said to be greater than another quantity y when $(x - y)$ is positive.

eXample:

If $x = 2$ and $y = -3$, thus $x > y$ because $2 - (-3) = 5$ or positive.

2. y is said to be less than x when $y - x$ is negative.

eXample:

If $x = 2$ and $y = -3$, than $y < x$ because $-3 - 2 = -5$ or negative.

Properties of Inequalities:

We apply the following properties to solve in-equalities.

1. An inequality will still hold after each side has been increased, decreased, multiplied or divided by the same positive quantity

$$\text{If} \quad x > y$$

For example:

$$x + z > y + z;$$
$$x - z > y - z;$$
$$xz > yz;$$
$$\frac{x}{z} > \frac{y}{z}$$

2. In an un-equality any term may be transposed from one side to the other if its sign be changed

$$\text{If} \quad x - y > z$$

For example: $x > z + y$

3. If the sides of an inequality is transposed, then the sign of inequality is reversed

Example: If $x > y$, then evidently

$$y < x$$

4. If both sides of the inequality are multiplied or divided by a negative number, then direction of the inequalities sign is reversed

Example: If $x > y$, then $-x < y$ and

$$\therefore \quad -xz < yz$$

5. The square of real quantity is positive, therefore it is greater than zero.

Therefore $(x - y)^2$ is always positive

$$\therefore (x - y)^2 > 0$$
$$\therefore x^2 + y^2 > 2xy$$

6. If x and y are two positive quantities, then their arithmetic mean $\left(\frac{x+y}{2}\right)$ is greater than their geometric mean $\left(\sqrt{xy}\right)$.

$$\therefore \quad \frac{x+y}{2} > \sqrt{xy}$$

example:

Solve the following inequalities

(i) $3x - 11 < 13$ *(ii)* $\frac{-x}{2} \leq 2$

Solution:

(i)

$$3x - 11 < 13$$

$$\therefore \quad 3x - 11 + 11 < 13 + 11 \text{ (using property 1)}$$

$$\therefore \quad 3x < 24$$

$$\therefore \quad \frac{3x}{3} < \frac{24}{3} \text{ (using property 1)}$$

$$\therefore \quad x < 8$$

(ii)

$$\frac{-x}{2} \leq 2$$

$$\therefore \quad \frac{-x}{2} \times 2 < 2 \times 2 \quad \text{(by property 1)}$$

$$\therefore \quad -x \leq 4$$

$$\therefore \quad -x \times -1 \geq 4 \times -1 \quad \text{(using property 4)}$$

$$\therefore \quad x \geq -4$$

Example: Find the greatest possible value of x, when the arithmetic mean of 5, 7 and x is less than 24.

Solution:

The arithmetic mean of three numbers 5, 7 and x is

$$\frac{5 + 7 + x}{3}$$

By given condition $\frac{5 + 7 + x}{3} < 24$

Now $\frac{(5 + 7 + x)}{3} \times 3 < 24 \times 3$ (using property 1)

$$\therefore \quad 12 + x < 72$$

$$\therefore \quad 12 + x - 12 < 72 - 12 \text{ (using property 1)}$$

$$\therefore \quad x < 60$$

Thus the greatest possible value of x is 59.

Example:

Solve $\frac{x}{4} - 4 > \frac{x}{5}$

Solution:

$$\frac{x}{4} - 4 > \frac{x}{5}$$

(C) $\frac{1}{b} > a$ (D) $\frac{1}{a} < b$

Q7. **If $a < c$ and $a < b$, assume $a \geq 0$ then which of the following statements are always true?**

(i) $b < c$ (ii) $a < bc$ (iii) $2a < b + c$

(A) only (i) (B) only (ii)

(C) only (iii) (D) (i) and (ii)

Q8. **If $6 - a > 7$, then**

(A) $a > 1$ (B) $a > -1$

(C) $a < -1$ (D) $a < 1$

Q9. **a has to be a whole number such that $0 \leq a \leq 10$. The solution for $a < 4$ and $a \geq 6$ is:**

(A) 5 (B) 7

(C) 3 (D) no solution

Q10. **If $5x > 2$ and $\frac{1}{2}x \leq 4$, list all the possible integral values of x?**

(A) 2, 3, 4, 5, 6 (B) 1, 2, 3, 4, 5, 6, 7, 8

(C) 2, 3 (D) 1

Q11. **The solution of the inequality $-1 < 5x - 6 \leq 4$ in whole number is**

(A) 1 (B) 2

(C) 4 (D) 5

Q12. **In inequality $y > 3x - 2$ if $a > b$, then which of the following statement is true?**

(A) $x = 1$ (B) $x > 1$

(C) $x < 1$ (D) $x \geq 1$

Q13. **If $\frac{a}{2} - 2 > \frac{a}{3}$, then which of the following statement is true?**

(A) $a < 12$ (B) $a > 12$

(C) $a = 12$ (D) $a \geq 12$

Q14. **Which of the following inequalities is the solution of the inequality $7a - 5 < 2a + 18$?**

(A) $a < 23$ (B) $a > 13$

(C) $a \leq 23$ (D) $a \geq 13$

Q15. **For which values of p is $p^2 - 5p + 6$ negative?**

(A) $p < 0$ (B) $2 < p < 3$

(C) $x > 3$ (D) $x < 2$

Explanatory Answers

Q1. (C) The product of two numbers > 0 is only possible when either both numbers are positive or both are negative. Since $x < 0$, y must also be negative

Q2. (A) In this case a and b are both positive ($a > 0$, $b > 0$), but $a - b$ is negative, which is only possible when $a < b$.

Q3. (B) When the lines will be extended to the right. They will make a triangle, and the sum of the angles of the triangle is 180°. Therefore, the sum of the two angles in a triangle is less than 180°.

Q4. (A) Since both inequalities have the same direction, therefore the corresponding sides can be added. Thus,

$$\begin{array}{r} a + b > 7 \\ \underline{a - b > 5} \\ 2a > 12 \\ \boxed{a > 6} \end{array}$$

Q5. (C) If $A > B$ and $C < 0$, then multiplication of both sides by C reverses the inequality Which implies
$AC < BC$. Also adding and subtracting in inequality, gives

$$A + C > B + C \quad \text{and}$$
$$A - C > B - C$$

But $A - C < B - C$ is not possible.

Q6. (C) Since b is a +ve fraction less than 1, therefore $\frac{1}{b}$ is a positive fraction greater than 1. Hence

$$\frac{1}{b} > a$$

Q7. (C) Statements (i) and (ii) are not always true.

Q8. (C) Given $6 - a > 7$

$\Rightarrow$ $a > 1$

Dividing both sides by -1. This will reverse the inequality sign

$a < -1$

Q9. (D) Given set is $\{0,1,2,3,4,5,6,7,8,9,10\}$, the number $a < 4$ are $\{0,1,2,3\}$ and the numbers $a \geq 6$ are $\{6,7,8,9,10\}$. Since there are no common elements between the last two sets. Therefore, there is no solution of the inequality.

Q10. (B) $5x > 2$ $\qquad \frac{1}{2}x \leq 4$

$x > \frac{2}{5}$ $\qquad \frac{1}{2}x \times 2 \leq 4 \times 2$

$x \leq 8$

from above the integers greater than $\frac{2}{5}$ and less than and equal to 8 are 1,2,3,4,5,6,7,8

Q11. (B) Given $-1 < 5x - 6 \leq 4$, first of all get rid -6 then 5 in the middle term
To get rid -6, add 6 to each part

$-1 + 6 < 5x - 6 + 6 \le 4 + 6$

$\Rightarrow \; 5 < 5x \le 10$

To get rid of 5, divide each part by 5.

$\frac{5}{5} < \frac{5x}{5} \le \frac{10}{5}$

$1 < x \le 2$

$\therefore$ only 2 is a whole number solution

Q12. (C) Since $x > y$ and $y > 3x - 2$, this implies that

$x > 3x - 2 \quad \Rightarrow \quad -2x > -2$

Dividing both sides by -2 will reverse the inequality symbol

$\frac{-2x}{-2} < \frac{-2}{-2}$

$\Rightarrow \; \boxed{x < 1}$

Q13. b) Given $\frac{a}{2} - 2 > \frac{a}{3}$

adding $\frac{-a}{2}$ both sides of the inequality

$\frac{a}{2} - 2 - \frac{a}{2} > \frac{a}{3} - \frac{a}{2}$

$-2 > \frac{-a}{6} \Rightarrow \frac{-a}{6} < -2$

$-a < -12$

dividing both sides by -1 will reverse the inequality sign, therefore

$a > 12$

Q14. (A) $7a - 5 < 2a + 18$

$7a - 2a < 18 + 5$

$5a < 23$

$\Rightarrow \; a < 23$

Q15. (B) Given $p^2 - 5p + 6$. The given expression factors into $(p - 3)(p - 2)$. If the expression is negative then the factors must have opposite signs. If $(p - 2)$ is negative and $(p - 3)$ is positive there are no such number. It is only possible when $(p - 3)$ is negative and $(p - 2)$ is positive, then $p > 2$ and $p < 3$. So, $2 < p < 3$ is the correct choice.

****

x years old. In terms of x, how old will Mohsan be?

(A) $\frac{x-4}{3}$ (B) $\frac{x+4}{3}$

(C) $x+4$ (D) $x-4$

Q10. **If the sum of one third of a number and twice the same number is 28, the number is:**

(A) 10 (B) 12
(C) 28 (D) 14

Q11. **A man's present age is x years. If his age in 8 years will be $\frac{4}{5}$ of what it will be in 20 years, then his present age is:**

(A) 45 (B) 25
(C) 30 (D) 40

Q12. **When 42 is added to twice a number, the result is 346, the number is:**

(A) 104 (B) 242
(C) 152 (D) 265

Q13. **A man was 26 years old when his daughter was born. Now, he is three times as old as his daughter. How many years old is the daughter now?**

(A) 13 years (B) 22 years
(C) 15 years (D) 12 years

Q14. **13 years ago Shabbir's mother was 7 times as old as he was. She is now 48 years old. How many years old is Shabbir now?**

(A) 28 (B) 18
(C) 38 (D) 20

Q15. **If 5 years are added to a man's present age and that age is tripled, he will be 84. What is his present age?**

(A) 18 (B) 23
(C) 32 (D) 54

Explanatory Answers

Q1. **(A)** **Let** the required number be x. Then $x - 5 = 2x - 7$

$\Rightarrow$ $\boxed{x = 2}$. Thus the correct answer is 2.

Q2. **(C)** Let

$$\begin{aligned} x &= \text{first integer} \\ x + 2 &= \text{second integer} \\ x + 4 &= \text{third integer} \\ 3(x) &= 3 + 2(x + 4) \\ 3x &= 3 + 2x + 8 \\ x &= 11 \end{aligned}$$

Third integer is $(x + 4) = \boxed{15}$

Q3. (A) Let the number $= x$, then

$$\frac{2}{5}x = 30$$

$$\Rightarrow x = \frac{30 \times 5}{2}$$

$$\Rightarrow x = 75$$

Q4. (C) Let the weight of Saira $= x$

and Umber's weight $= y$

$x - 25 = y$

and $x + y = 205$

$\Rightarrow x - y = 25$

$\underline{x + y = 205}$

$2x = 230$

$$x = \frac{230}{2} = 115 \text{ pound}$$

Q5. (A) Let the smaller number $= x$

Then the larger number $= 3x$

Now $3x + x = 36$

$4x = 36$

$x = 9$

The larger number is $36 - 9 = 27$

Q6. (C) $p + q = 352$ and $\frac{p}{10} = q \Rightarrow p = 10q$

$10q + q = 352 \Rightarrow 11q = 352 \Rightarrow q = 32$

Now $p + 32 = 352 \Rightarrow \boxed{p = 320}$

Q7. (B) 30 packers will load $30 \times \frac{1}{8}$ or $\frac{30}{8}$ boxes in 9 minutes. There are 90 minutes in $1\frac{1}{2}$ hours. So the 30 packers will load $10 \times \frac{30}{8}$ or $37\frac{1}{2}$ boxes in $1\frac{1}{2}$ hours.

Q8. (D) Asma is one-third older or $\frac{1}{3} \times 15 = 5$ years older. Let x be the age of Uzma and $x + 5$ be Asma's age. When Asma was twice the age of Uzma, $2x = x + 5$ or $x = 5$. Uzma was 5 years old and Asma was $x = 5$ or 10 years old, twice Uzma's age. Since Uzma is 15 years old now, Uzma was 5 years old 10 years ago.

Q9. (A) Assume x for Mohin and y for Mohsin

x is three times y $\Rightarrow x = 3y$

x in four years $\Rightarrow x = x + 4$

$\Rightarrow x = 3y + 4$

$\Rightarrow x - 4 = 3y$

$$\frac{x-4}{3} = y$$

Q10. **(B)** Let x be the required number, then

$$\frac{1}{3}x + 2x = 28$$

$\Rightarrow$ $x + 6x = 84$

$\Rightarrow$ $7x = 84$

$\Rightarrow$ $\boxed{x = 12}$

Q11. **(D)** Present age $= x$

$$x + 8 = \frac{4}{5}(x + 20)$$

$$5x + 40 = 4x + 80$$

$$5x - 4x = 80 - 40$$

$$\boxed{x = 40}$$

Q12. **(C)** Let x be the required number, then

$$2x + 42 = 346$$

$\Rightarrow$ $2x = 304$

$\Rightarrow$ $\boxed{x = 152}$

Q13. **(A)** Let x be the age of man and y be the age of his daughter

$$x - 26 = y \quad \text{.........(1)}$$

$$x = 3y \quad \text{.........(2)}$$

Substituting the value of x in (1)

$$3y - 26 = y$$

$$2y = 26 \Rightarrow \boxed{y = 13}$$

Q14. **(B)** Let x be the age of Shabbir

$$7(x - 13) = 48 - 13$$

$$7(x - 13) = 35$$

$$x - 13 = 5$$

$$\boxed{x = 18}$$

Q15. **(B)** Let x be the man's present age, then

$$3(x + 5) = 84$$

$\Rightarrow$ $x + 5 = 28$

$\Rightarrow$ $\boxed{x = 23}$

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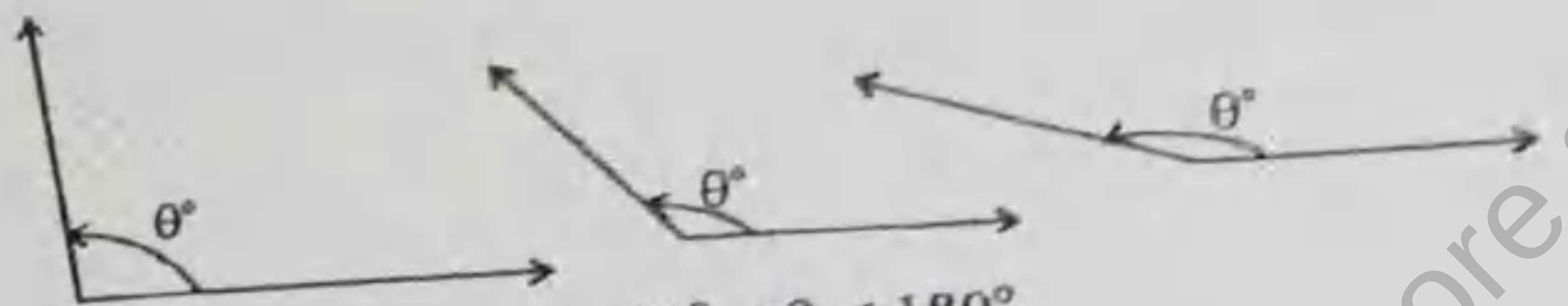
In all above figures θ lies between 0 and 90°.

Obtuse Angle:

An angle whose measure is greater than 90° and less than 180° is called obtuse angle.

eXamples



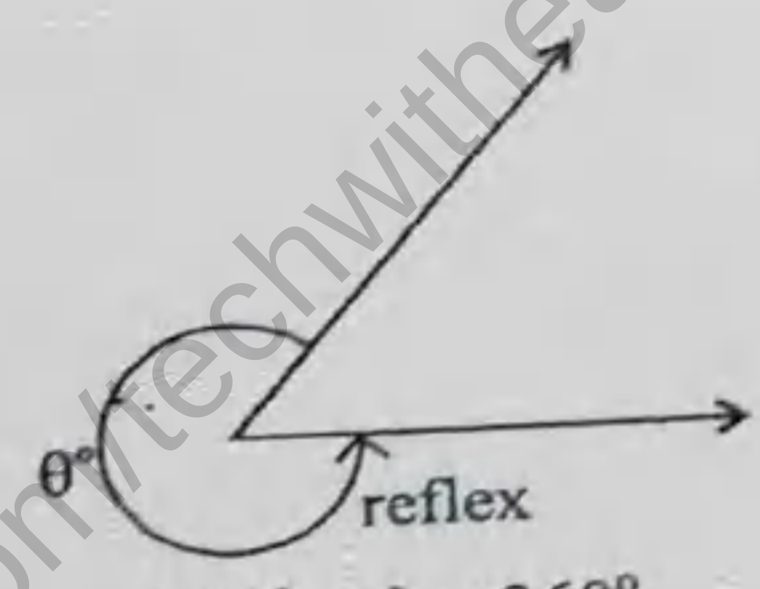
$90^\circ < \theta < 180^\circ$

In all above figures θ lies between 90° and 180°.

Reflex Angle:

A reflex angle is between 180° and 360°.

eXample:

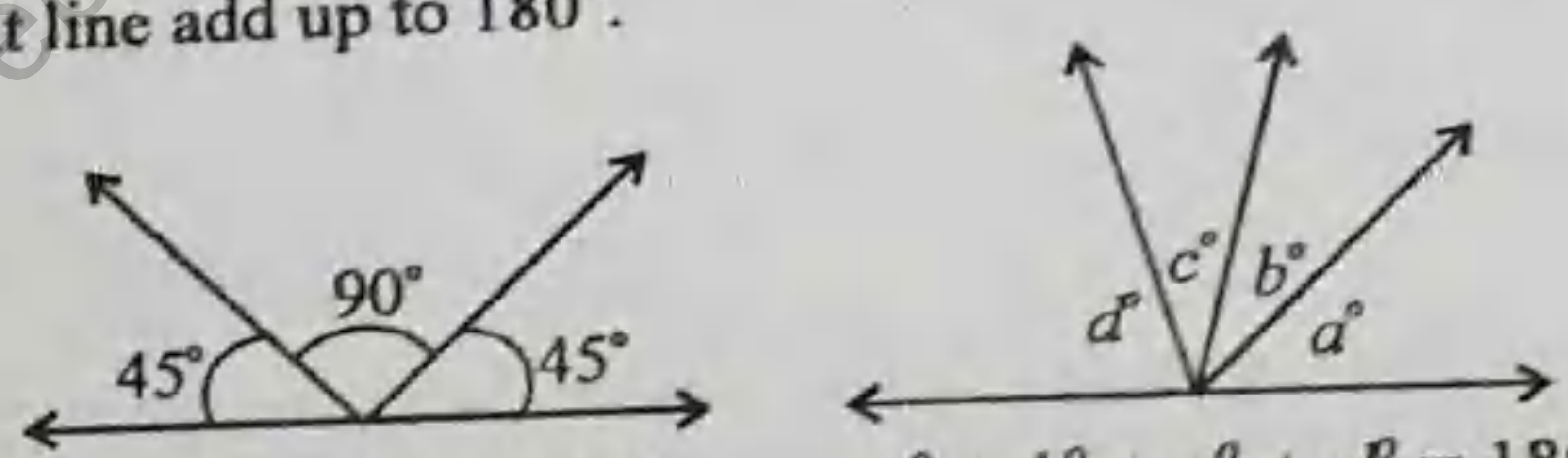


$180^\circ < \theta < 360^\circ$

A reflex angle lies between 180° and 360° degrees.

Calculating Angles:

Angles on a straight line add up to 180°.

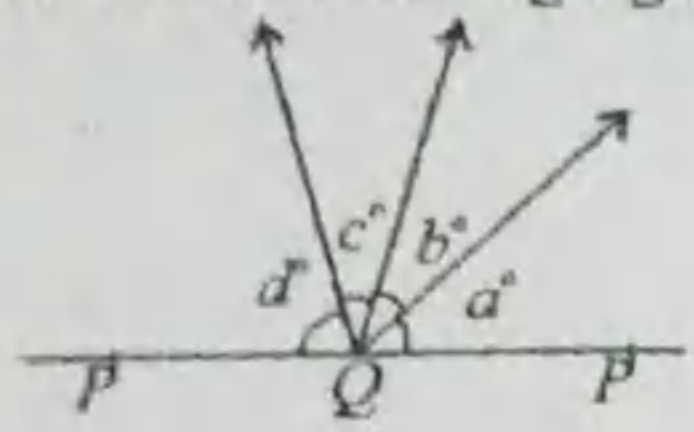


$45^\circ + 90^\circ + 45^\circ = 180^\circ$ $\quad a^\circ + b^\circ + c^\circ + d^\circ = 180^\circ$

A straight angle is 180°. So angles on a straight line add up to 180°.

Example 1:

What is the average of a, b, c and d in the following figure



Solution:

In the given figure since $\angle PQR$ is a straight angle. Because the angles on a straight line add up to 180°, therefore

$$a + b + c + d = 180^\circ$$

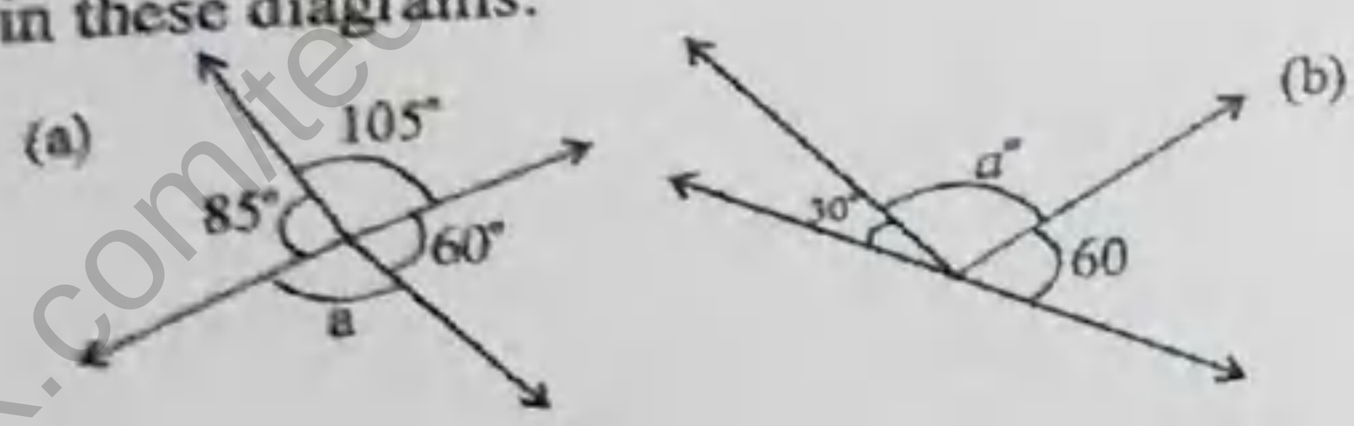
Average is

$$\frac{180^\circ}{4} = 45^\circ$$

Note:	Angles in a full turn add upto 360°.

Example 2:

Find the angle a in these diagrams.



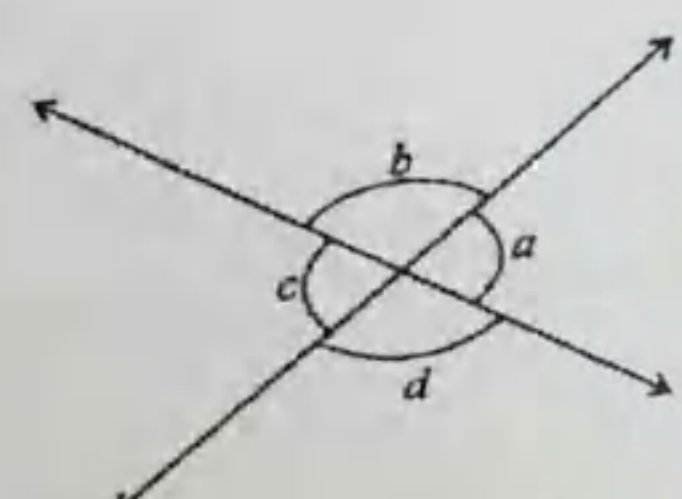
Solution:

a) a $= 360^\circ - (60^\circ + 105^\circ + 85^\circ)$
$= 360^\circ - 250^\circ$
$= 110^\circ$

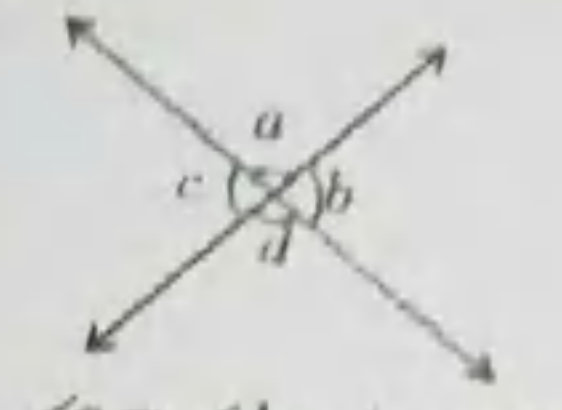
b) a $= 180^\circ - (60^\circ + 30^\circ)$
$= 180^\circ - 90^\circ$
$= 90^\circ$

Vertical Angles:

When two straight lines intersect, they make four angles. The two opposite angles are called vertical angles. In this diagram angles a, c and b, d are vertical angles.



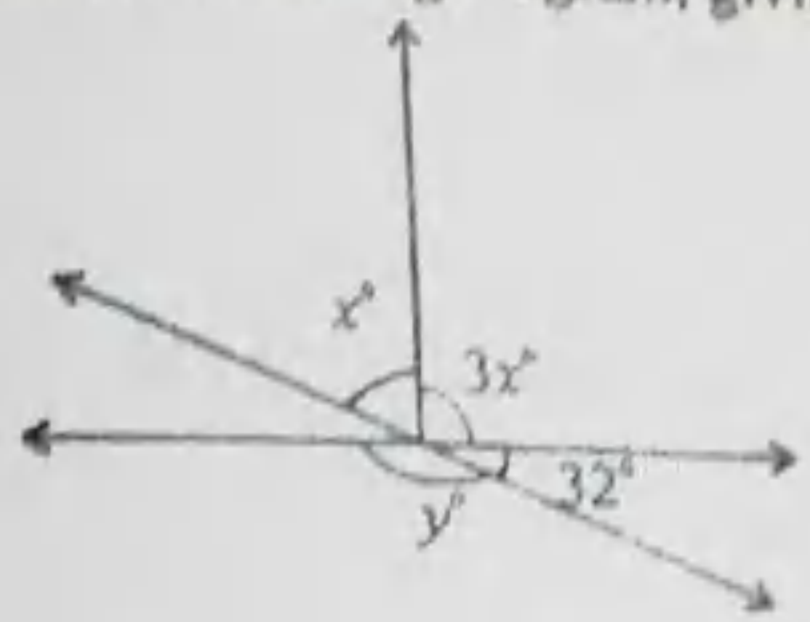
Vertically opposite angles are equal



$\angle a = \angle d$; $\angle c = \angle b$

Example 3:

Find the value of pronumerals in the following diagram, giving reasons:



Solution:

Because angles on a straight line add up to 180°, and vertically opposite angles are equal:

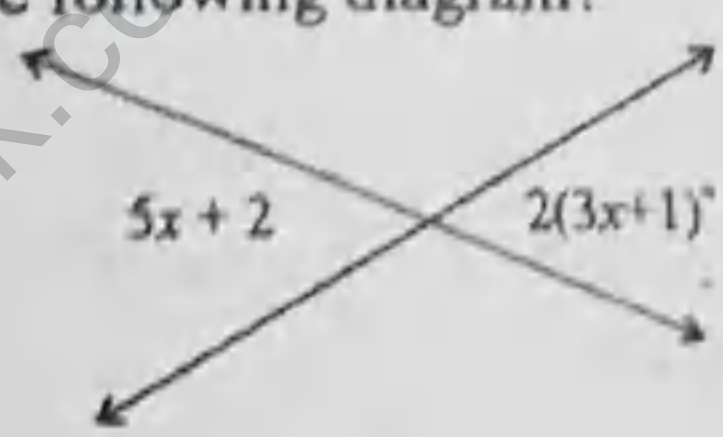
$$3x + x + 32 = 180^\circ \Rightarrow 4x = 148 \Rightarrow x = 37^\circ$$

$$\therefore \quad y^\circ = 3x^\circ + x^\circ \Rightarrow y = 4(37^\circ) \Rightarrow y = 148^\circ$$

Again

Example 4:

What is the value of x in the following diagram?



Solution:

Since the vertically opposite angles are equal:

$$5x + 11 = 2(3x + 1)$$

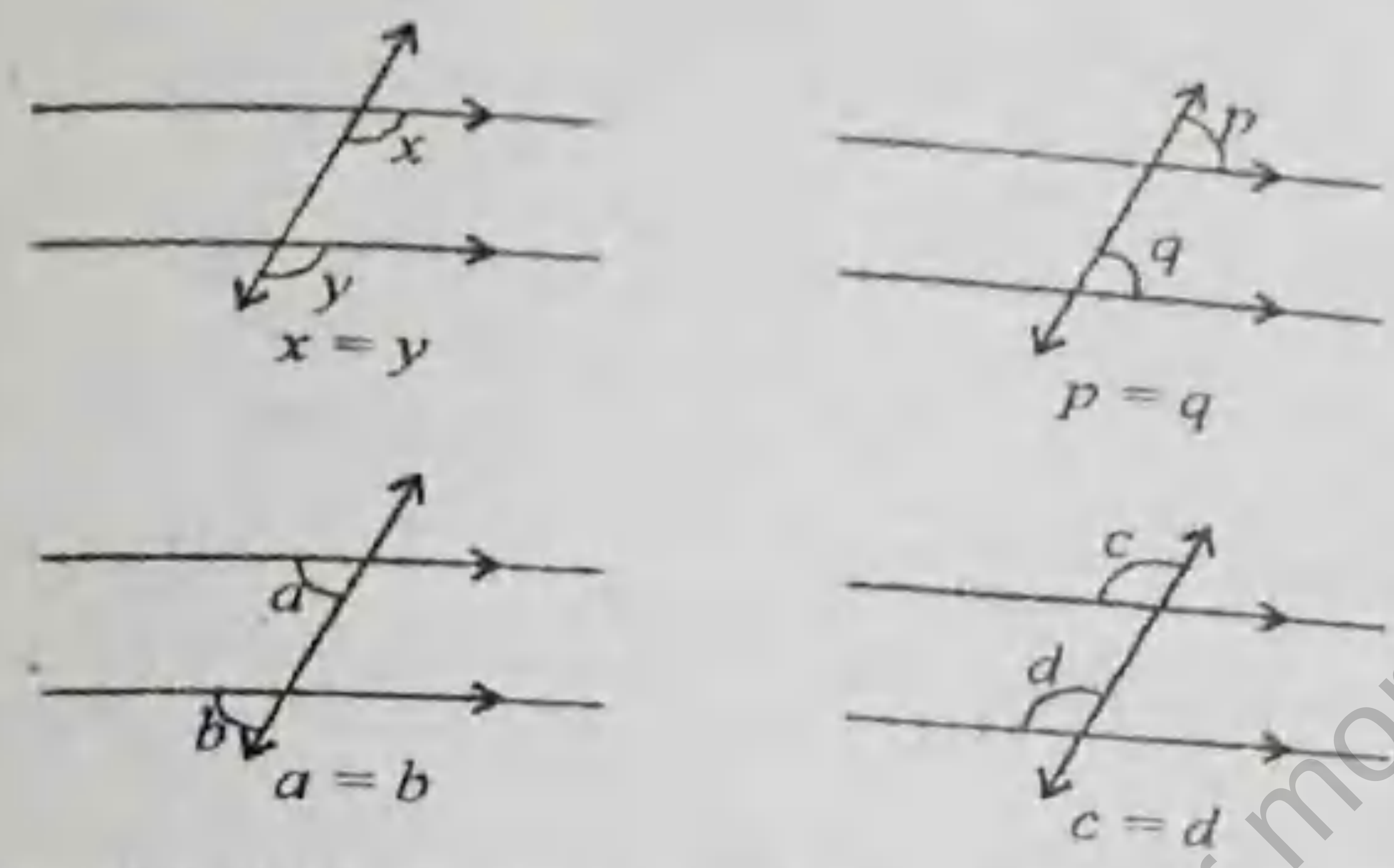
$$5x + 11 = 6x + 2$$

$$\Rightarrow \boxed{x = 9}$$

Parallel Lines:

Parallel lines are always the same distance apart. They never meet, even if you make them longer. Parallel lines form no angles.

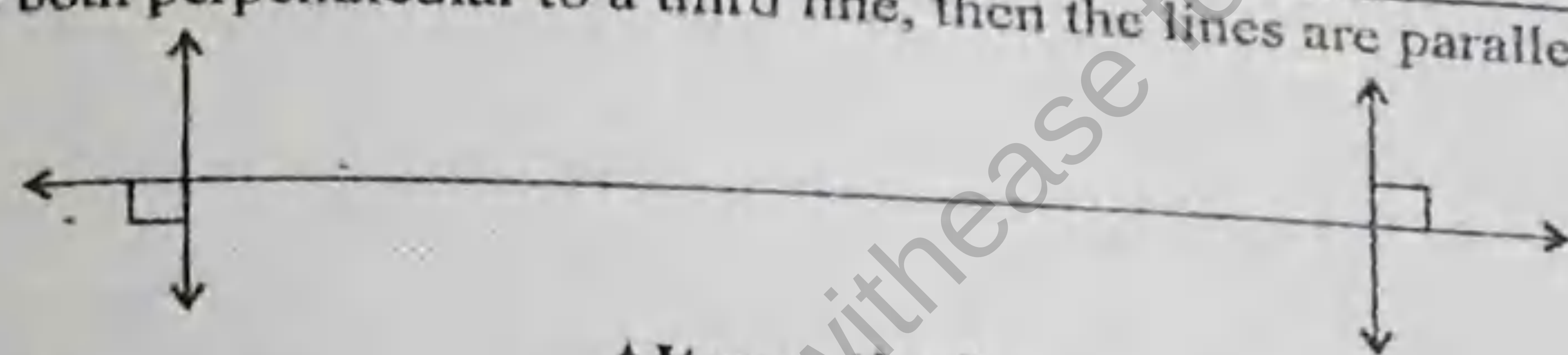
Corresponding angles are two angles in corresponding positions relative to the two lines and the transversal. These corresponding angles are also equal. A pair of equal corresponding angles is shown below.



$x = y$ $p = q$

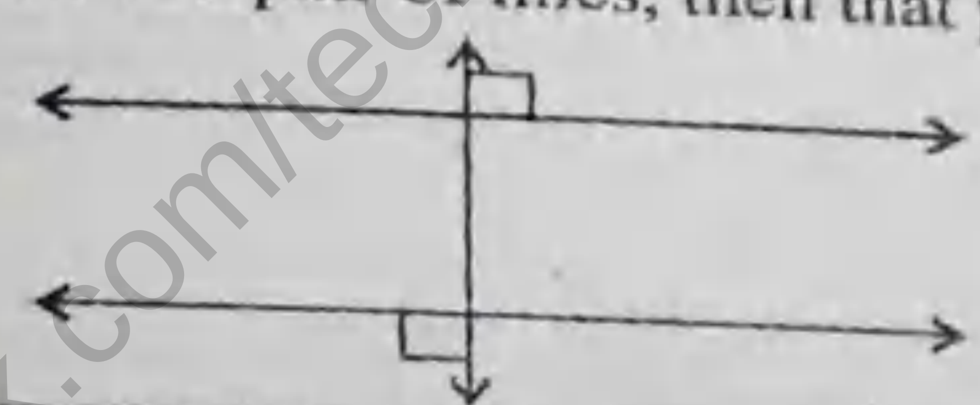
$a = b$ $c = d$

If two lines are both perpendicular to a third line, then the lines are parallel.



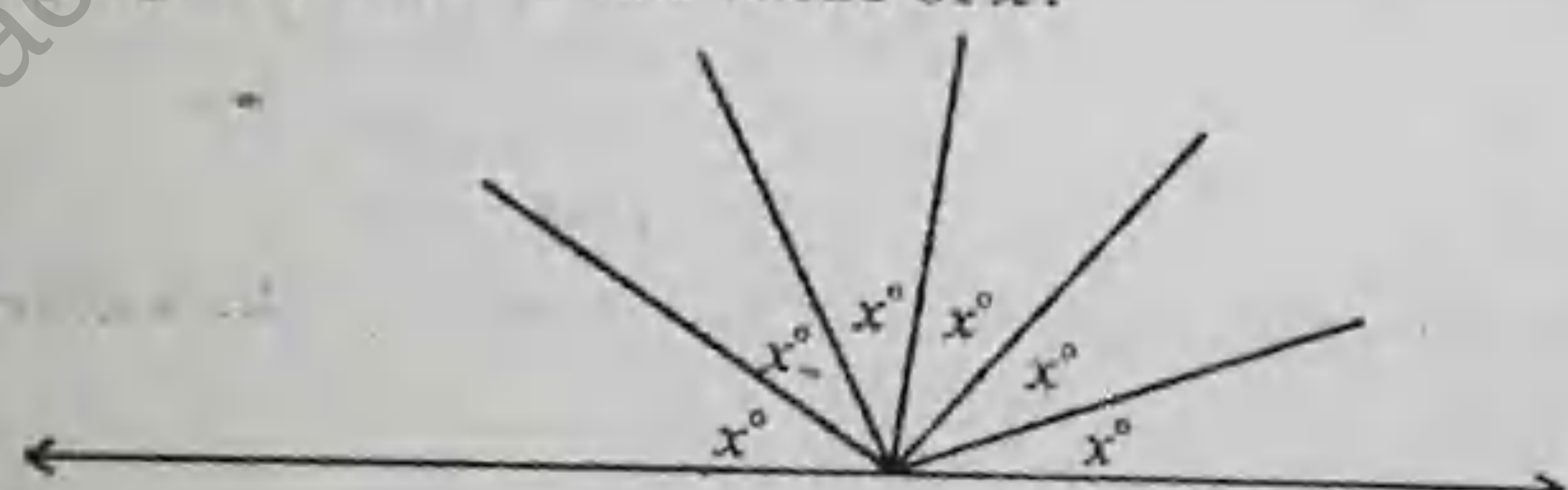
Alternatively

If a line is perpendicular to each of a pair of lines, then that pair of lines are parallel.



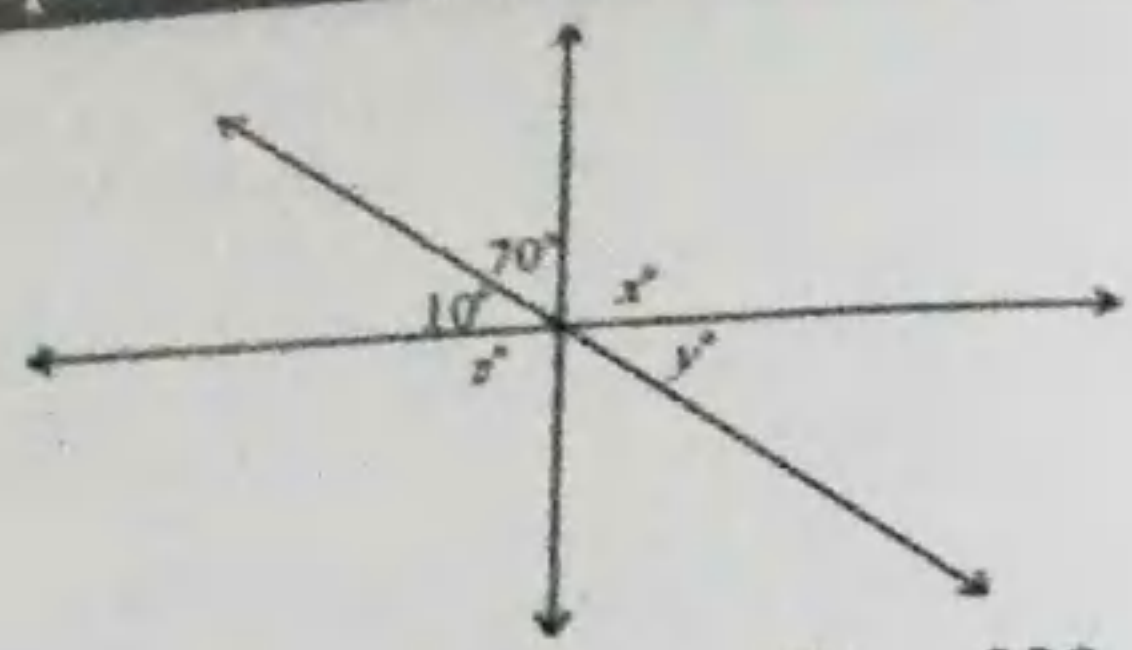
Multiple Choice Questions (MCQs)

Q1. In the following figure, what is the value of x?



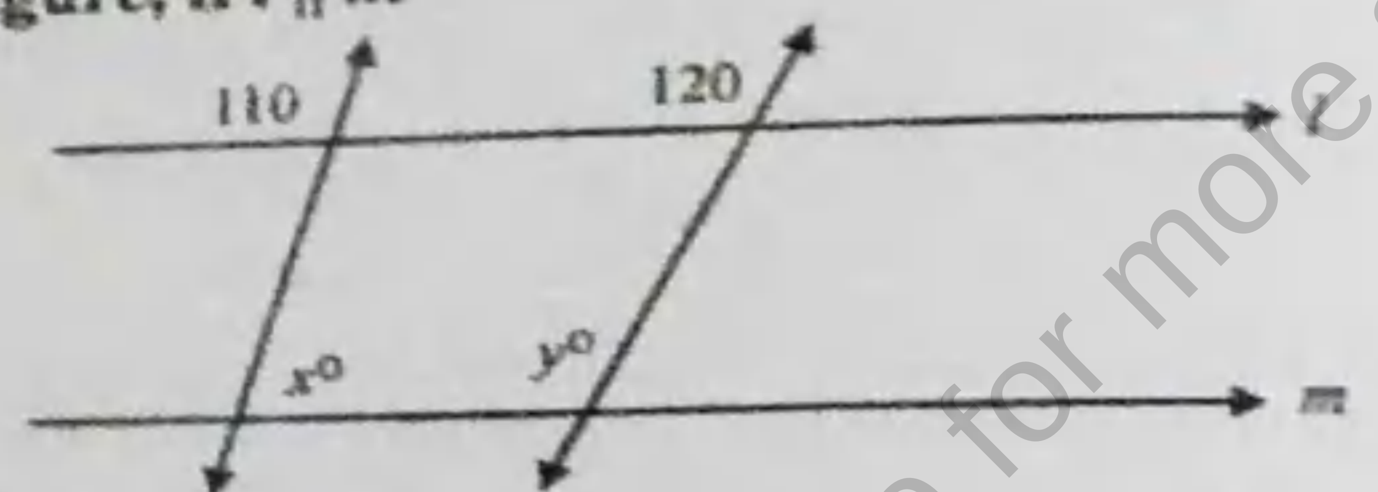
(A) 30 **(B)** 45
(C) 40 **(D)** 35

Q2. In the figure below, what is the value of $x + y + z$?



(A) 200
(B) 220
(C) 210
(D) 190

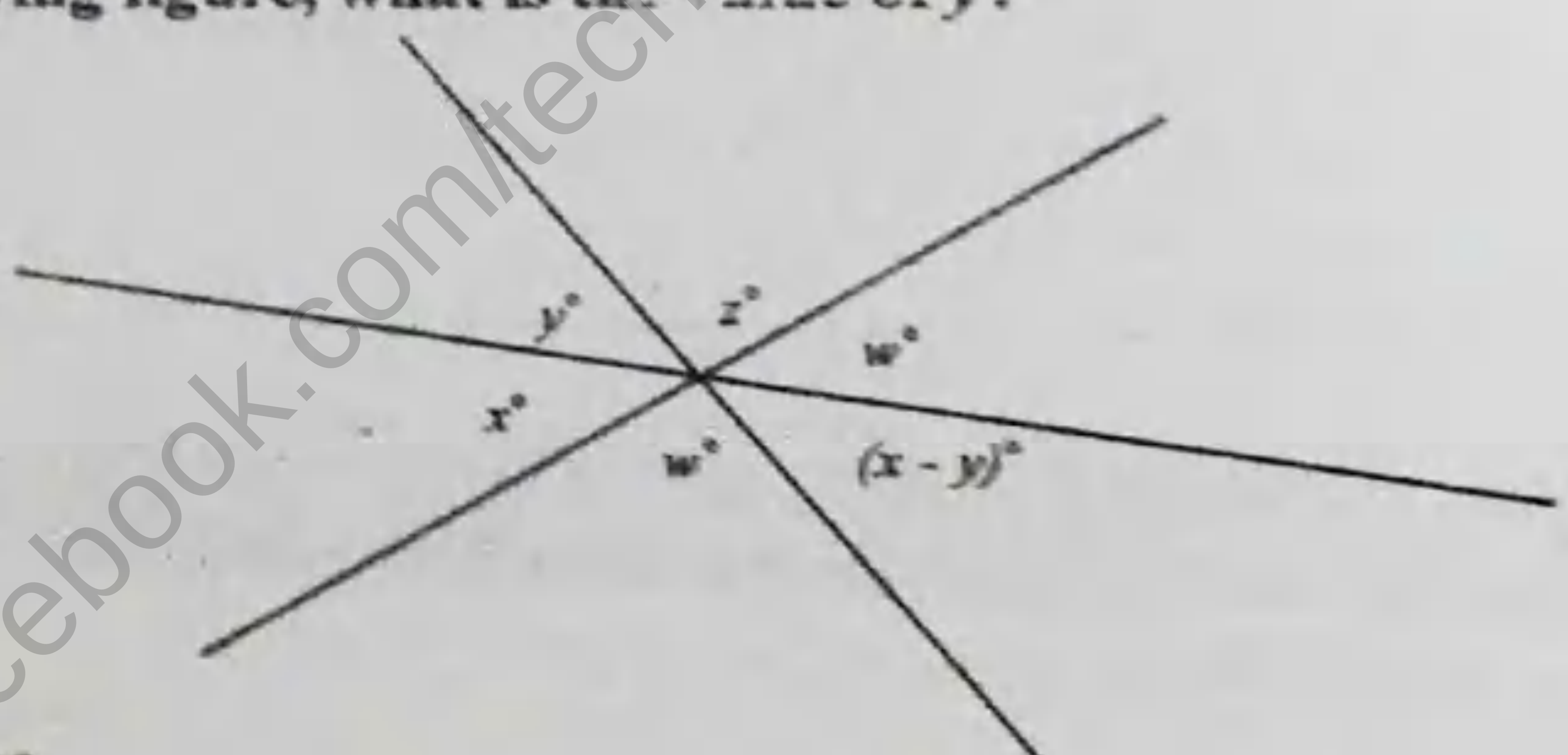
Q3. In the following figure, if $l \parallel m$



Then $x° + y°$ ________ 190°

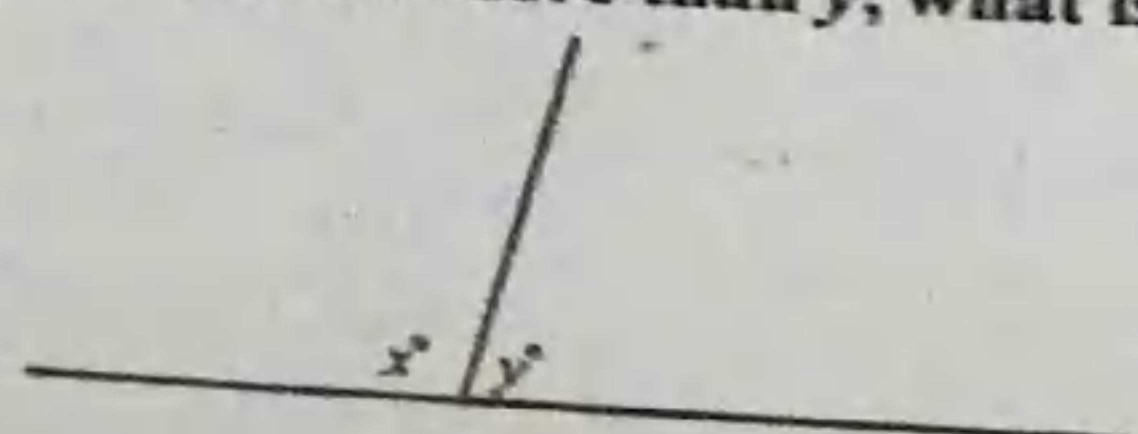
(A) =
(B) <
(C) >
(D) ÷

Q4. In the following figure, what is the value of y?



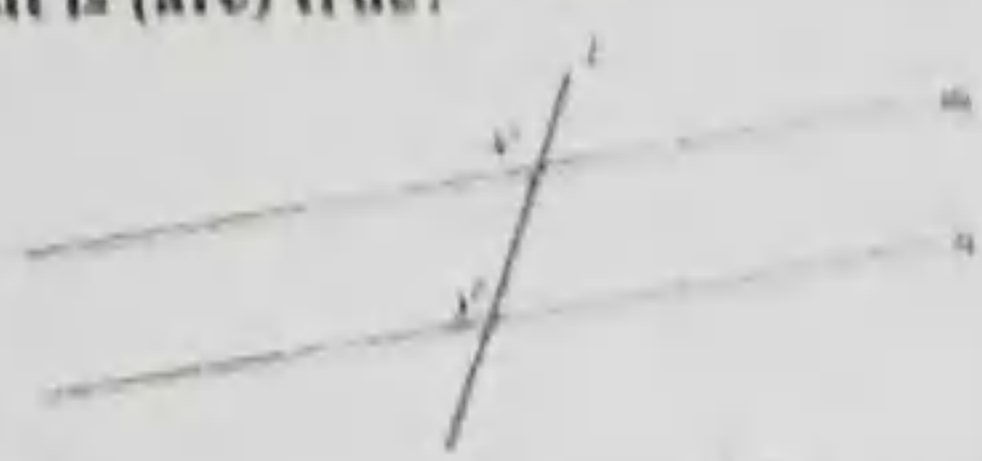
(A) 45°
(B) 36°
(C) 46°
(D) 35°

Q5. In the figure below, if x is 130 more than y, what is the value of y?



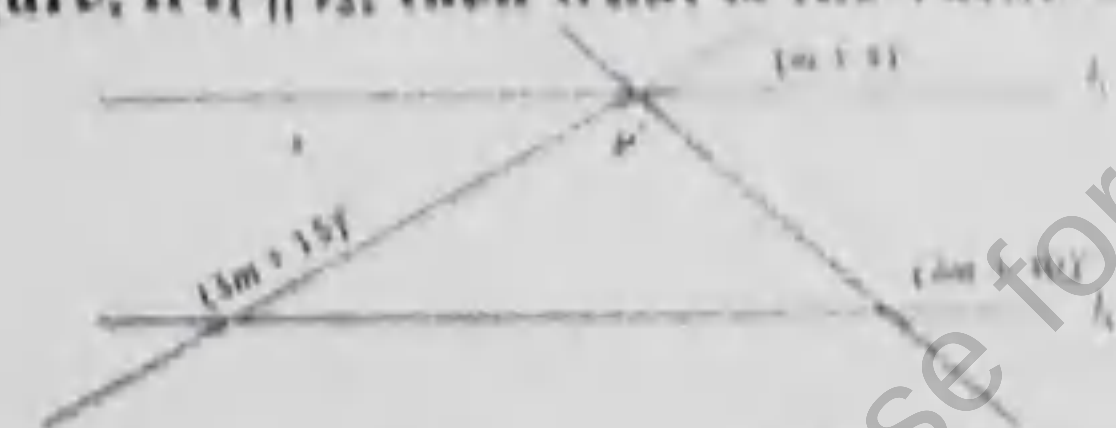
(A) 7 (B) 15
(C) 25 (D) 35

Q6. **In the following figure, $m \parallel n$ and l is a transversal, then which of the following statement is (are) true?**



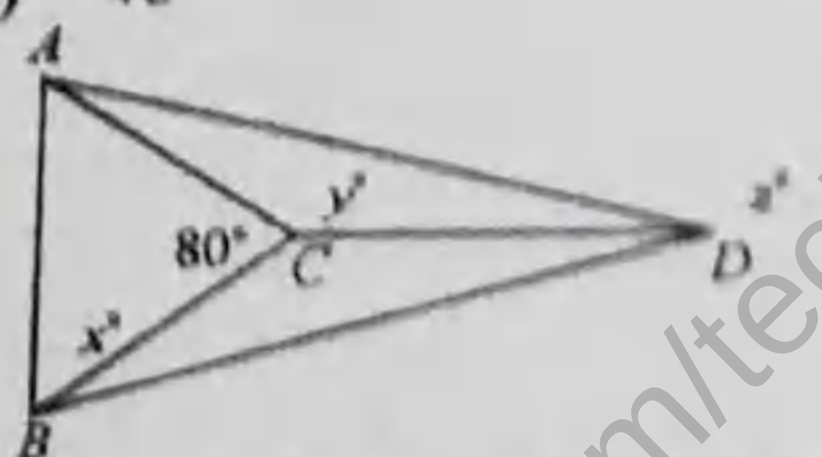
(A) $x + y = 180$ (B) $x - y = 180$
(C) $180 < x + y \leq 270$ (D) Insufficient information

Q7. In the following figure, if $l_1 \parallel l_2$, then what is the value of p?



(A) 70 (B) 45
(C) 40 (D) 65

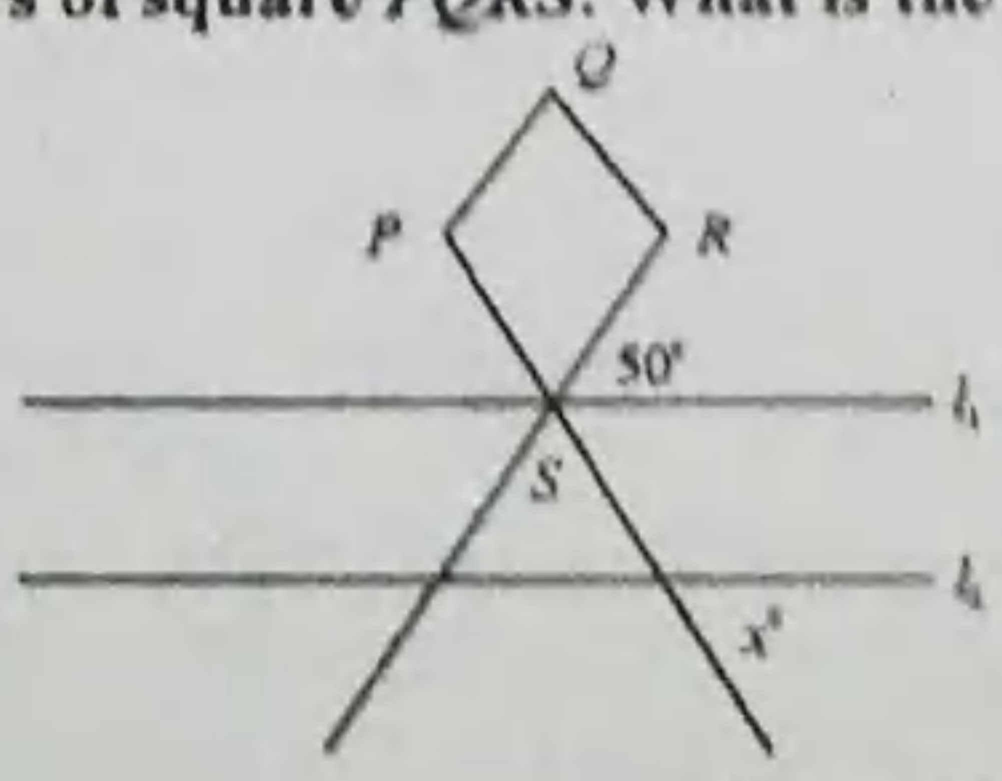
Q8.



In the above figure, AC = BC = CD and $m\angle ACB = 80°$. This information is sufficient to determine the value of which of the following?

(A) x only (B) y only
(C) x and y only (D) y and z only

Q9. **In the following figure, lines l_1 and l_2 are parallel, and line l_1 passes through S, one of the corners of square $PQRS$. What is the value of x?**

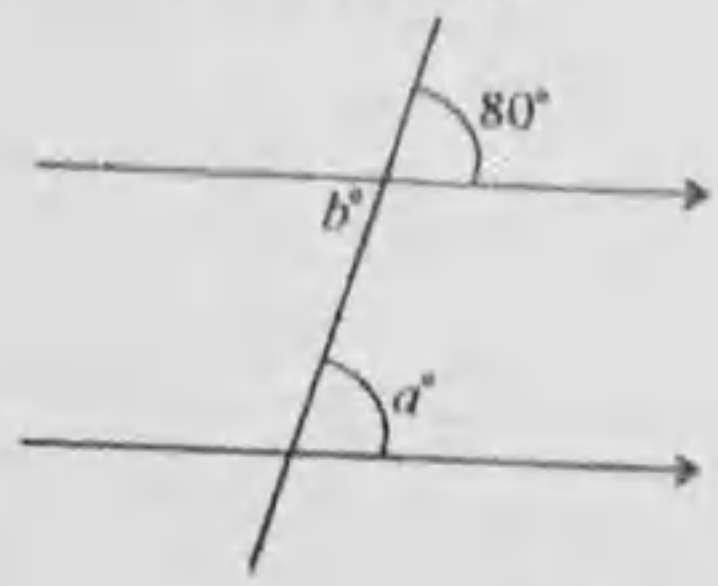


(A) 50 (B) 30

Q14. **In the fig below, what is the value of x?**

(A) 20°
(B) 70°
(C) 100°
(D) 110°

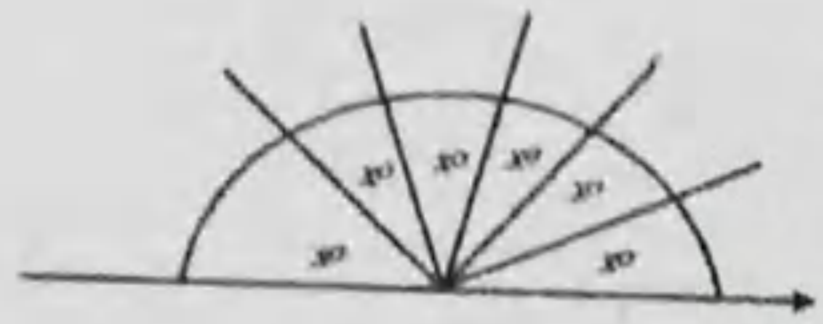
Q15. **In the fig below, what is the value of a?**



(A) 100°
(B) 60°
(C) 80°
(D) 40°

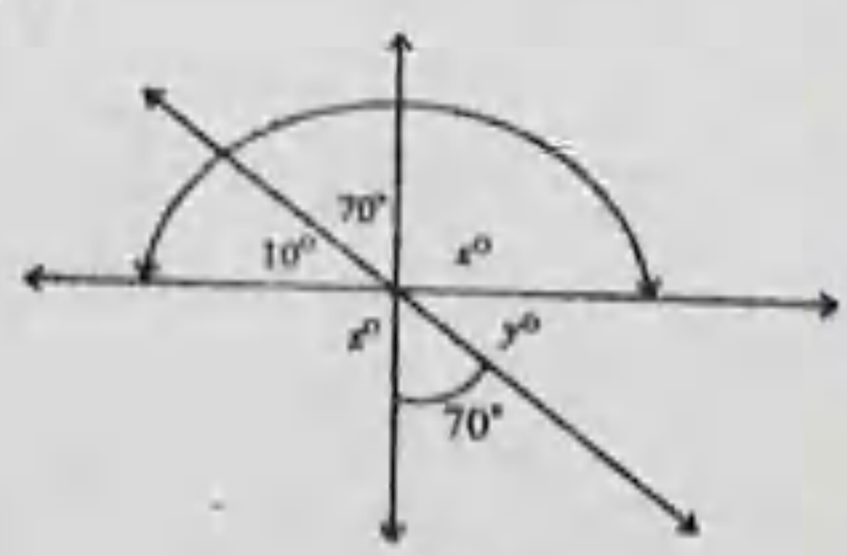
Explanatory Answers

Q1. (A) The sum of the given six angles make a straight angle, and the straight angle equal 180°. Thus



$$x^o + x^o + x^o + x^o + x^o + x^o = 180^o$$
$$\Rightarrow \quad 6x^o = 180^o$$
$$\Rightarrow \quad x^o = 30^o$$

Q2. (C) In the given figure, the arc shows a straight angle, hence



$10 + 70 + x = 180^o$

$x = 100$

Because opposite angles are equal, thus

$x = z^o = 100 \Rightarrow z = 100$

Similarly, $\quad z + 70 + y = 180^o$

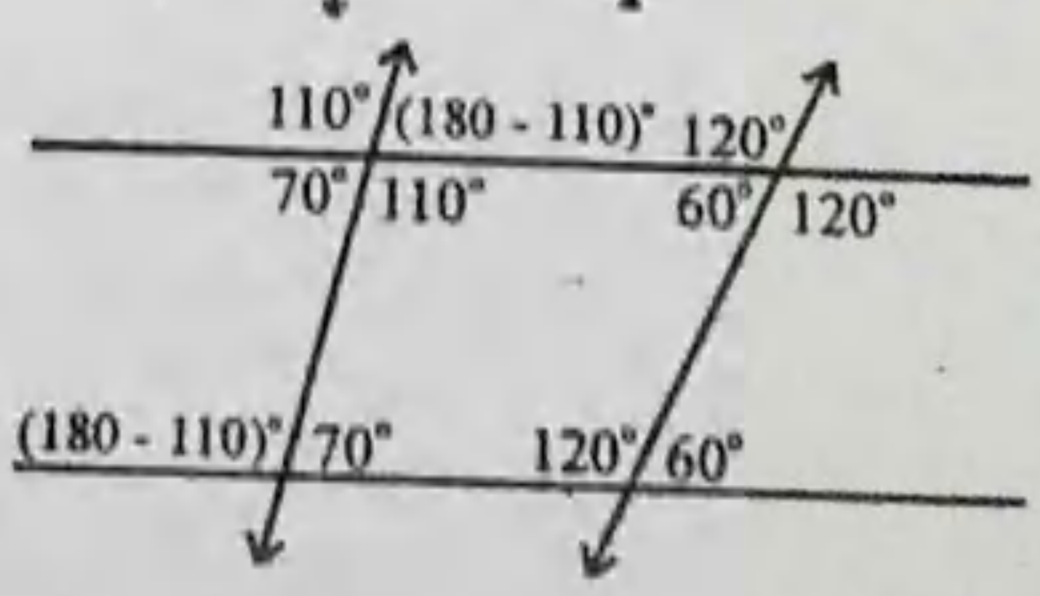
$100 + 70 + y = 180^o$

$(\because z = x = 100)$

$\Rightarrow \quad y = 10$

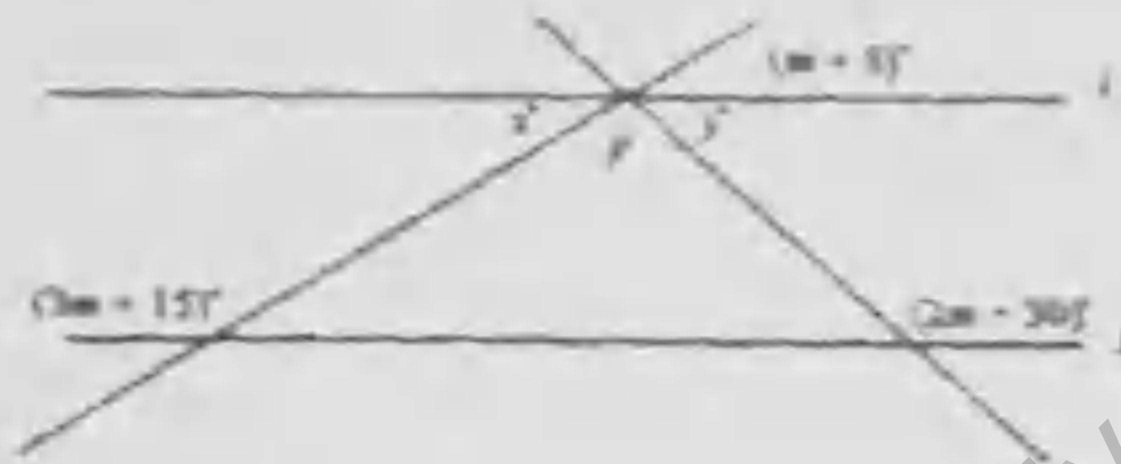
Thus,

Sum of the angles $x + y + z \quad = 100 + 10 +$



Q7. (D) Since, when two straight lines intersect, the vertical angles are equal, therefore

$$x^{\circ} = m + 5$$



and $x + (3m + 15) = 180$, but $x = m + 5$

Hence,

$(m + 5) + (3m + 15) = 180 \Rightarrow 4m + 20 = 180 \Rightarrow 4m = 160$

$\boxed{m = 40}$

$\Rightarrow$ $x = m + 5 \Rightarrow x = 40 + 5 \Rightarrow \boxed{x = 45}$

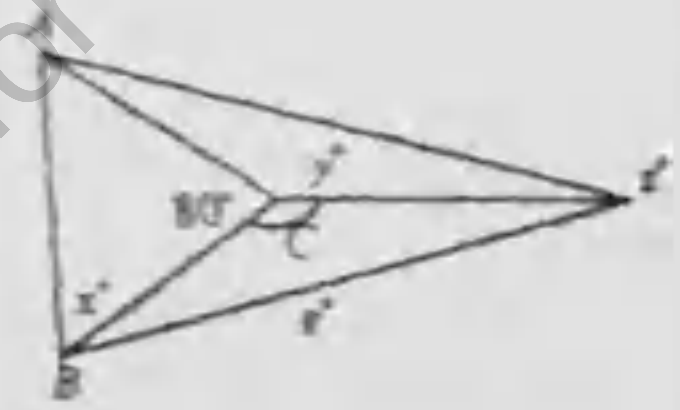
As,

From figure, $x + p = 2m + 30$ ($\because$ Alternative angles are equal)

$45 + p = 2(40) + 30 \quad \Rightarrow 45 + p = 80 + 30 \Rightarrow 45 + p = 110$

$\Rightarrow p = 110 - 45 \quad \Rightarrow \boxed{p = 65}$

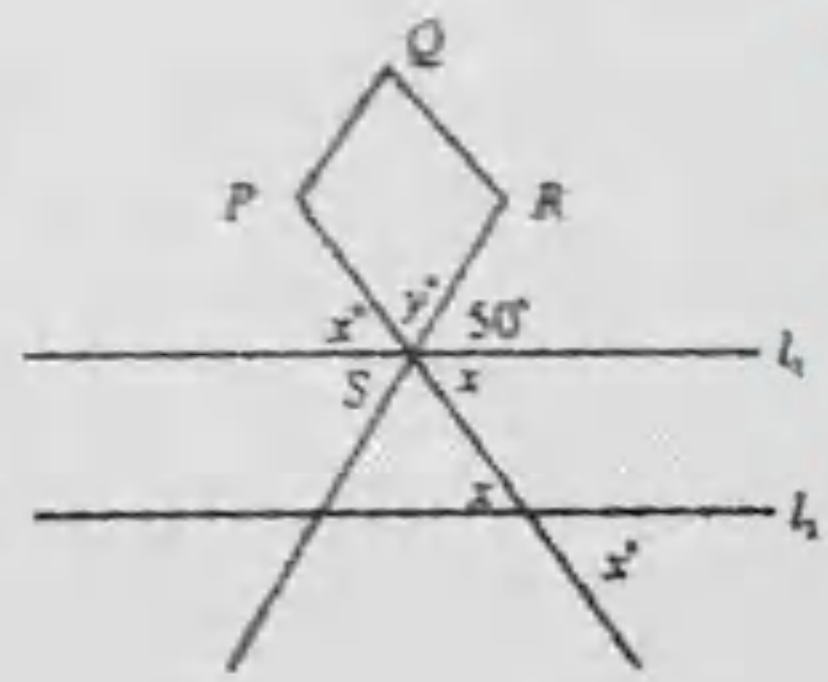
Q8. (A) Since $AC = BC$, we know that when two sides of a triangle are equal then their opposite angles are also equal. Hence $\angle A = \angle B$, and $\angle A = \angle B = x^{\circ}$. In any triangle, the sum of the three angles is equal to 180.



$\angle A + \angle B + \angle C = 180^{\circ} \Rightarrow x^{\circ} + x^{\circ} + 80^{\circ} = 180^{\circ} \Rightarrow 2x = 100$

$x = 50$

$\because$ y and e are not necessarily equal, therefore, we cannot determine y and z. The answer is x only.



Q9. (D) $\because$ $PQRS$ is a square,

$\therefore \quad y = 90$. Then

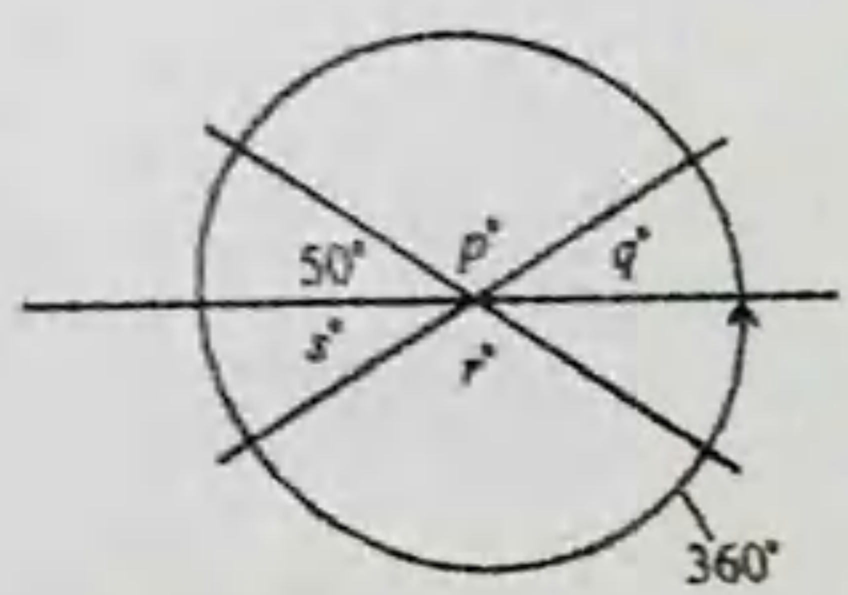
$x + y + 50 = 180$

$x + 90 + 50 = 180$

($\because$ Alternative angles are equal)

$x + 140 = 180 \quad \Rightarrow x = 40$

Q10. (C) $\because q > p$, then q must be greater than 90 and p less than 90. Therefore, the largest number less than 90 that can fit in the grid is 89.9.

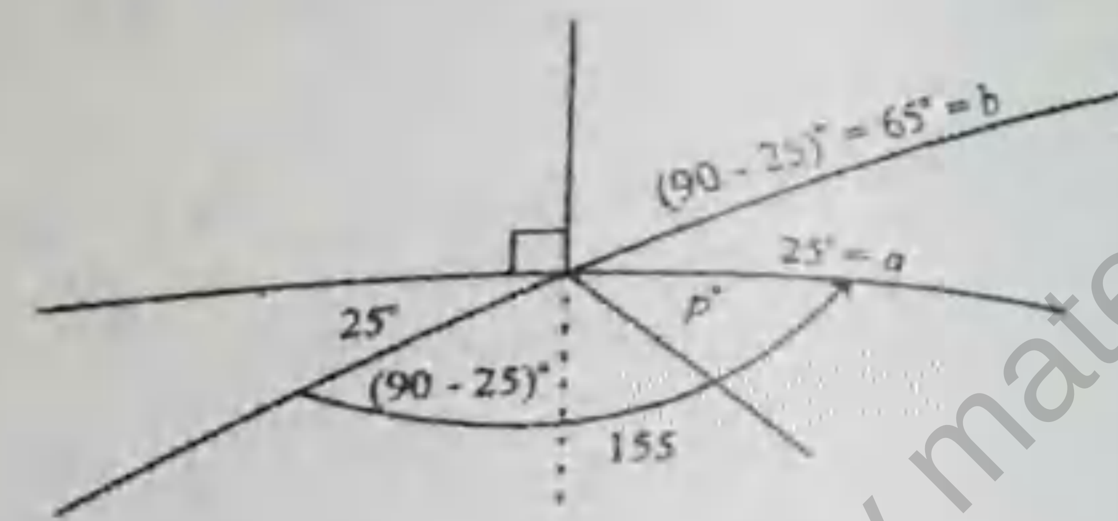


Q11. (D) $\because$ vertical angles are equal

$\therefore p + q + r + s + 50 + 50 = 360$

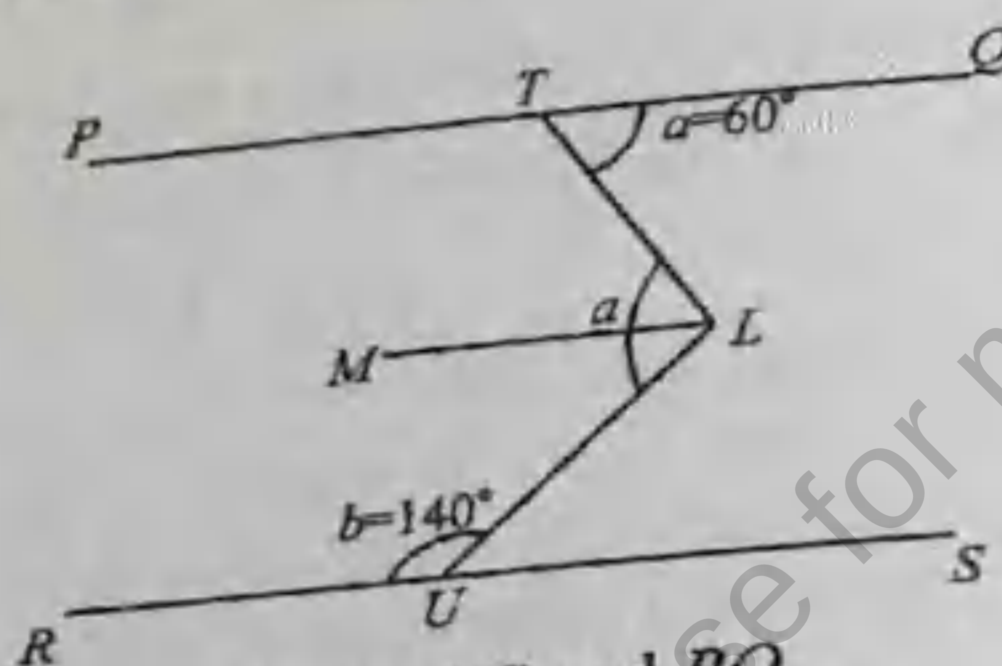
$\Rightarrow p + q + r + s = 260$

$$\text{Average} = \frac{p+q+r+s}{4} = \frac{260}{4} = 65$$



Q12. (E) Since vertical angles are equal, here, $a = 25$, and so $p + q = 155$. We see that $b = 65$, and there is no other vertical angle. So it is impossible to determine p and q from the given information.

Q13. (C)



Through point L, draw ML parallel to RS and PQ.

$\angle c = \angle MLU + \angle MLT$

$\angle MLU = \angle LUS = 180^\circ - 140^\circ = 40^\circ$

$\angle MLT = \angle LTQ = 60^\circ$

Then $\angle c = 60^\circ + 40^\circ = 100^\circ$

Q14. (B) Since $x + 90 + 20 = 180$, Therefore

$x = 70^\circ$

Q15. (C) Since, vertical opposite angles are equal, therefore $\angle b = 80^\circ$. Again because alternative angles are equal. Therefore, $\angle a = \angle b$

$\Rightarrow \angle a = 80^\circ$

****

CHAPTER 1

NUMBER SYSTEM

MULTIPLE CHOICE QUESTIONS

☆ Each question has four possible answers. Choose the correct answer and encircle it.

Topic 1 Real Numbers

Q.1. *A real number system contains*
a. positive numbers
b. negative numbers
c. zero
d. (option *a*, b and c)

Q.2. *For each real number, there is a number which is its*
a. negative
b. positive
c. opposite
d. similar

Q.3. *Rational number is a number which can be written as a terminating decimal fraction or a*
a. non-terminating decimal fraction
b. non-recurring
c. recurring decimal fraction
d. *a*, b and c

Q.4. *The set of rational number is represented by*
a. W
b. $\Re$
c. Q'
d. Q

Q.5. *Union of the sets of rational and irrational numbers is called the set of*
a. Natural numbers
b. Real numbers
c. Whole numbers
d. Prime numbers

Q.6. **There is no element common in**
a. N and W
b. E and W
c. N and O
d. Q and Q'

Q.7. $\sqrt{11}$ *is*
a. an Irrational number
b. Rational number
c. Odd number
d. Negative number

Q.8. *The decimal fraction in which we have finite number of digits in its decimal part is called a*
a. recurring decimal fraction
b. non terminating fraction
c. non recurring fraction
d. terminating decimal fraction

Q.9. *The square root of every incomplete square is an*
a. Rational numbers
b. Even numbers
c. Odd numbers
d. Irrational numbers

Q.10. $\sqrt{B}$ *is*
a. Irrational number
b. Prime number
c. Whole number
d. Natural number

Q.22. The negative square root of 9 can be written as:

a. $-\sqrt{9}$ b. $\sqrt{9}$

c. $\sqrt{81}$ d. $-\sqrt{81}$

Q.23. If a and b are real numbers then a+b is also real number this law is called

a. associative law of addition b. closure law of addition

c. distributive law of addition d. commutative law of addition

Q.24. The identity element with respect to subtraction is

a. 0 b. 1

c. 0 and 1 d. None of these

Q.25. If $a \in R$, then the additive inverse of a is

a. $\frac{1}{a}$ b. $-\frac{1}{a}$

c. a d. $-a$

Q.26. $\frac{2}{9}, \frac{5}{7} \in R, \left(\frac{2}{9}\right)\left(\frac{5}{7}\right) = \frac{10}{63} \in R$ **this property is called**

a. associative property b. identity property

c. commutative property d. closure property w.r.t multiplication

Q.27. 3.5 + 5.4 = 5.4+3.5 = 8.9 this property of addition is called

a. additive identity b. associative property

c. commutative property d. closure property

Q.28. $\sqrt{2}+(\sqrt{3}+\sqrt{5})=(\sqrt{2}+\sqrt{3})+\sqrt{5}$ **; this property is called**

a. associative property w.r.t. addition

b. commutative property

c. closure property w.r.t addition

d. additive identity

Q.29. For any two real numbers x and y, $x \div y$ is equal to

a. $x\left(\frac{1}{y}\right)$ b. $\frac{x}{y}$

c. $\frac{1}{x}(y)$ d. option a and b

Q.30. The set of positive integers, 0 and negative integers is known as the set of

a. Natural numbers b. Rational numbers

c. all integers d. Irrational numbers

Q.31. There exist no rational number x, such that

a. $x^2 = 4$ b. $x = 9$

c. $x^2 = 2$ d. $x^2 = \frac{1}{49}$

Q.32. ***If P is a whole number greater than 1, which has only P and 1 are factors. Then P is called***

a. Whole number b. Prime number
c. Even numbers d. Odd number

Q.33. ***14 is not a***

a. Prime number b. Whole number
c. Even number d. Real number

Q.34. ***Any whole number can be written as a product of factors which are***

a. Even numbers b. Odd numbers
c. Prime numbers d. Rational numbres

Q.35. ***24 can be written as a product of***

a. Odd factors b. Even factors
c. Whole factors d. Prime factors

Q.36. ***Which of the following, has closure property w.r.t. addition***

a. $\{1\}$ b. $\{1,2\}$
c. $\{0\}$ d. $\{1,1\}$

Q.37. ***If $\frac{4+16x}{4} = 0$, then x =***

a. 4 b. $-\frac{1}{4}$
c. -4 d. ± 4

Q.38. ***If $a < b$, and $b < c$, then***

a. $a > b$ b. $a < c$
c. $a = c$ d. $c < b$

Q.39. ***If $a \leq b$, and $b \leq a$, then***

a. $a = b$ b. $b \geq a$
c. $a > b$ d. $a < b$

Q.40. ***If $a < b$, and $c > 0$, then***

a. $ac = bc$ b. $ac = 0$
c. $ac < bc$ d. $ac > bc$

Q.41. ***If $a < b$, and $c \leq d$, then***

a. $a + c < b + d$ b. $a+c > b+d$
c. $a+c = b+d$ d. $a+c \geq b+d$

Q.42. ***If $0 < a < b$, then***

a. $b = 0$ b. $a+b = 0$
c. $\frac{1}{a} > \frac{1}{b}$ d. $\frac{1}{a} < \frac{1}{b}$

Q.43. ***If $a < b < 0$, then***

a. $\frac{1}{a} > \frac{1}{b}$
b. $\frac{1}{a} < \frac{1}{b}$
c. $\frac{1}{a} = \frac{1}{b}$
d. $\frac{1}{a} \leq \frac{1}{b}$

Q.44. ***If $a < b$, and $c < 0$, then***

a. $ac = bc$
b. $ac \geq bc$
c. $ac \leq bc$
d. $ac > bc$

Q.45. ***For any $a \in R$***

a. $a^2 > 0$
b. $a^2 < 0$
c. $a^2 \leq 0$
d. $a^2 \geq 0$

Q.46. ***If a and b are any real numbers, then***

a. $|a+b| > |a| + |b|$
b. $|a+b| \geq |a| + |b|$
c. $|a+b| = |a| + |b|$
d. $|a+b| \leq |a| + |b|$

Q.47. ***If a and b are any real numbers, then***

a. $|a-b| < |a| - |b|$
b. $|a-b| < |a| - |b|$
c. $|a-b| \geq |a| - |b|$
d. $|a-b| > |a| - |b|$

Q.48. ***If a is an element of R, and a=a, this property is called***

a. Symmetric property
b. Trichotomy property
c. Transitive property
d. Reflexive property

Q.49. ***If $a, b, c \in R$ and $a = b \wedge b = c \Rightarrow a = c$***
This property is called

a. Reflexive property
b. Additive property
c. Transitive property
d. Symmetric property

Q.50. ***For all $a, b, c \in R$ and $a = b \Rightarrow ac = bc \wedge ca = cb$.***
This property is called

a. Multiplicative inverse
b. Symmetric property
c. Multiplicative property
d. Identity element

Q.51. ***For all $a, b \in R$, and $a = b \Rightarrow b = a$, this property is called***

a. Reflexive property
b. Multiplicative property
c. Additive property
d. Symmetric property

Q.52. ***For all $a, b, c \in R$ and $a = b \Rightarrow a+c = b+c$***
The name of this property is

a. Transitive property
b. Symmetric property
c. Additive property
d. Cancellation property w.r.t addition

Q.53. ***For all $a, b, c \in R$ $a+c = b+c \Rightarrow a = b$,*** In the algebra of real numbers we can replace -1 with

b. i^{4}

d. $\sqrt{1}$

The imaginary part of a complex number $x+iy$ is

b. y

d. i

... is the

a. additive inverse of a complex number

b. multiplicative identity of a complex number

c. multiplicative inverse of a complex number

d. additive identity of a complex number

The multiplicative identity for the set of a complex number is

b. (1, 0)

d. (−1, 0)

The multiplicative inverse of a complex number (a, b) is

a. (−a, −b)

b. (a, −b)

c. (−1, −1)

d. $\left(\frac{a}{a^2+b^2}, \frac{-b}{a^2+b^2}\right)$

The additive inverse of a complex number (a, b) is

b. (−a, b)

c. (−a, −b)

d. $\left(\frac{a}{b}, -\frac{b}{a}\right)$

If $z_1 = a_1 + ib_1$ and $z_2 = a_2 + ib_2$, then $z_1+z_2 =$

b. (a_1+a_2, b_1+b_2)

d. (a_1a_2, b_1b_2)

Q.75. *If $z_1 = x_1 + iy_1$, and $z_2 = x_2 + iy_2$, then $z_1 z_2 =$*

a. $(x_1x_2 - y_1y_2,\ x_1y_2 + y_1x_2)$
b. $(x_1y_1 - x_2y_2,\ x_1y_2 + y_1x_2)$
c. $(x_1 + x_2,\ y_1 + y_2)$
d. $(x_1y_2 - y_1x_2,\ x_1y_2 + y_2x_2)$

Q.76. *If $z = x + iy = (x, y)$, $\forall\ x, y > 0$, then Arg z will be*

a. in first qudrant
b. in second quadrant
c. in fourth quadrant
d. in third quadrant

Q.77. *If $z = x - iy = (x, -y)$, $\forall x > 0,\ y > 0$, then Arg z will be*

a. in first quadrant
b. in second quadrant
c. in third quadrant
d. in fourth quadrant

Q.78. *If $z = -x - iy = (-x, -y)$, $\forall x > 0\ y > 0$, then Arg z will be*

a. in first quadrant
b. in second quadrant
c. in third quadrant
d. in fourth quadrant

Q.79. *$\forall x > 0, y > 0$, if $z = (-x, y)$, and Arg z, is in second quadrant then Arg z =*

a. $-\pi - \tan^{-1} \frac{y}{x}$
b. $\pi - \tan^{-1} \frac{y}{x}$
c. $-\pi + \tan^{-1} \frac{y}{x}$
d. $\pi - \tan^{-1} \frac{y}{x}$

Q.80. *$\forall x, y > 0$, if $z = (x, y)$, then Arg z =*

a. $\pi + \tan^{-1} \frac{y}{x}$
b. $\pi - \tan^{-1} \frac{y}{x}$
c. $\tan^{-1} \frac{y}{x}$
d. $\tan^{-1} \frac{-y}{x}$

Q.81. *$\forall x, y < 0$, if $z = (-x, -y)$, then Arg z =*

a. $-\pi + \tan^{-1} \frac{y}{x}$
b. $-\pi - \tan^{-1} \frac{y}{x}$
c. $+\tan^{-1} \frac{y}{x}$
d. $\tan^{-1} \frac{x}{y}$

Q.82. *$\forall\ x, y > 0$, if $z = (-x, y)$, then Arg z =*

a. $-\pi - \tan^{-1} \frac{y}{x}$
b. $\pi - \tan^{-1} \frac{y}{x}$
c. $\pi + \tan^{-1} \frac{y}{x}$
d. $-\pi + \tan^{-1} \frac{y}{x}$

Q.83. *$x, y > 0$, if $z = (x, -y)$, then Arg z =*

a. $-\tan^{-1} \frac{y}{x}$
b. $\tan^{-1} \frac{x}{y}$
c. $\pi - \tan^{-1} \frac{y}{x}$
d. $\pi + \tan^{-1} \frac{y}{x}$

Q.84. *If $z=(0,-y)$, and z lies on $OY^{/}$ where $y>0$, then Arg z =*

a. π
b. $-\pi$
c. $\frac{\pi}{2}$
d. $-\frac{\pi}{2}$

Q.85. *If $z=(-x,0)$ and z lies on $OX^{/}$ where $x>0$ then Arg z=*

a. π
b. $\frac{\pi}{2}$
c. $-\frac{\pi}{2}$
d. $-\pi$

Q.86. *If $z=(x,0)\in OX$, where $x>0$, then Arg z =*

a. $\frac{\pi}{2}$
b. $-\pi$
c. 0
d. π

Q.87. *If $z=(0, y)\in OY$, where $y>0$, then Arg z =*

a. $-\pi$
b. π
c. -0
d. $\frac{\pi}{2}$

Q.88. *If $z=x+iy$, then $\bar{z}$ =*

a. x^2+y^2
b. x^2-y^2
c. $\sqrt{x^2+y^2}$
d. $x-iy$

Q.89. *If $z=-x+iy$, then $\bar{z}$ =*

a. $(-x)^2+(y)^2$
b. $x-iy$
c. $-x-iy$
d. $x+iy$

Q.90. $\sqrt{-1}\ b=$

a. b
b. $-b$
c. ib
d. $-ib$

Q.91. $\sqrt{-5}=$

a. $5i$
b. i^5
c. $i\sqrt{5}$
d. $i^2\ 5$

Q.92. $\sqrt{-\frac{16}{25}}=$

a. $i\frac{4}{5}$
b. $i^2\frac{16}{25}$

CHAPTER 2

SET, FUNCTIONS & GROUPS

MULTIPLE CHOICE QUESTIONS

Each question has four possible answers. Choose the correct answer and encircle it.

Topic 1 Bacis of Sets

Q.1. ***Which of the following statement is true?***
a. A set is a collection of non-empty objects
b. A set is a collection of only numbers
c. A set is any collection of things
d. A set is well-defined collection of objects

Q.2. ***If T = {2,4,6,8,10,12}, then***
a. T = {First six natural numbers}
b. T = {First six odd numbers}
c. T = {First six real numbers}
d. T = {First six even numbers}

Q.3. ***Which of the following is the definition of Singleton***
a. The objects in a set
b. A set having no element
c. A set having no subset
d. None of these

Q.4. ***If S = {3,6,9,12.......}, then***
a. S =Four multiples of 3
b. S =Set of even numbers
c. S=Set of prime numbers
d. S=All multiples of 3

Q.5. ***If $P = \{x | x = p/q$, where $p, q \in Z$ and $q \neq 0\}$, then P is the set of***
a. Irrational numbers
b. Even numbers
c. Rational numbers
d. Whole numbers

Q.6. **A = B iff**
a. All elements of A also the elements of B
b. A and B shoud be singleton
c. A and B have the same number of elements
d. If both have the same elements

Q.7. ***The set of months in a year beginning with S.***
a. {September, October, November}
b. Singleton set

c. Null set

d. Empty set

Q.8. ***$p \in A$ means***

a. P is subset of A

b. P is an element of A

c. P does not belongs to A

d. A does not element of P

Q.9. ***If there is one-one correspondence between A and B, then we write***

a. $A = B$

b. $A \subseteq B$

c. $A \supseteq B$

d. $A \sim B$

Q.10. ***$A = \{x : x$ is a positive integer and $x \leq 5\}$ is a***

a. Descriptive method

b. Tabular method

c. Set-builder method

d. Set of natural number

Q.11. ***If $A = \{x | x \in Q \wedge 0 < x < 1\}$, the A is***

a. Infinite set

b. Finite set

c. Set of rational numbers

d. Set of real numbers

Q.12. ***Empty set is***

a. Not the member of real numbers

b. infinite set

c. Finite set

d. Not subset of every set

Q.13. ***Every set is an improper subset of***

a. Empty set

b. Equivalent set

c. itself

d. Singleton set

Q.14. ***If $B = \{x | x \in R \wedge 0 < x < 1\}$, then B is***

a. Singleton set

b. Null set

c. Infinite set

d. Finite set

Q.15. ***$\{0\}$ is a***

a. Empty set

b. Singleton set

c. Zero set

d. Null set

Q.16. ***Z is a***

a. Infinite set

b. Finite set

c. Singleton set

d. Set of all integers

Q.17. ***If $A = \{x | x$ is a positive integer and $4x < 23\}$, then A =***

a. $\{1,2,3,4,5,6,7\}$

b. $\{4,5,6.....22\}$

c. $\{1,2,3,......23\}$

d. $\{1,2,3,4,5\}$

Q.18. ***If $A = \{3n \mid n \in Z^+ \wedge n < 6\}$, then A is***

a. $\{3,4,5,6\}$

b. $\{1,2,3,4,5,6\}$

c. $\{3,4,5\}$

d. $(3,6,9,12,15\}$

Q.19. *If $C = \{p | p < 18$, p is a prime number$\}$, then C =*

a. $\{1,2,3,4........17\}$ b. $\{2,4,6,8.......16\}$
c. $\{1,3,5,7,9,11,13,15,17\}$ d. $\{2,3,5,7,11,13,17\}$

Q.20. *If $A = \{2m | 2m < 9, m \in p\}$, then A =*

a. $\{2,3,4,5,6,7,8\}$ b. $\{2,4,6,8\}$
c. $\{4,6,\}$ d. $\{2,3,5,7\}$

Q.21. *If $B = \{x | x \in Z \wedge -3 < x < 6\}$, then n(B) =*

a. 5 b. $\{-3,-2,-1,0,1,2,3,4,5,6\}$
c. 8 d. 9

Q.22. *If $O = \{1,3,5........\}$, then n(O) =*

a. 99 b. Odd integers
c. Even numbers d. Infinite

Q.23. *If $A = \{2m | m^3 = 8, m \in Z\}$, Then A =*

a. $\{1,8,27\}$ b. $\{4\}$
c. $\{2,4,6\}$ d. $\{2,16,54\}$

Q.24. *If $C = \{x | 3x = 5, x \in N\}$, then C =*

a. $\{1\}$ b. $\frac{5}{3}$
c. ϕ d. 5

Q.25. *If $A = \{x | x \in Z^+ \wedge \sqrt{x} \leq 2\}$, then A =*

a. $\{1,3,4\}$ b. $\{4,9,16\}$
c. $\{1,2,3,4\}$ d. $\{\ \}$

Q.26. *If $A \subseteq B$, and B is a finite set, then*

a. $n(A) < n(B)$ b. $n(B) < n(A)$
c. $n(A) \leq n(B)$ d. $n(A) \geq n(B)$

Q.27. *The set of even prime numbers is*

a. $\{2,4,6,8,10\}$ b. $\{2,4,6,8,10,12\}$
c. $\{1,3,5,7,9\}$ d. $\{2\}$

Q.28. *If $Q = \{x | x = \frac{1}{y}, y \in N\}$, then*

a. $2 \in Q$ b. $1 \in Q$
c. $3 \in Q$ d. $0 \in Q$

Q.29. *If $D = \{a\}$, then P(D) =*

a. $\{a\}$ b. ϕ

Q.41. *Every subset of a finite set is*

a. Disjoint
b. Null
c. Finite
d. Infinite

Q.42. *Sets of the same element but in different orders are*

a. Equal set
b. Equivalent set
c. Disjoint set
d. Complement set

Q.43. *The number of elements of the power set of {{a,b}, {b,c}, {d,e}} is*

a. 3
b. 6
c. 8
d. 9

Q.44. *The number of elements of power set of { } are*

a. 1
b. 2
c. 0
d. 3

Q.45. *All possible subsets of {{φ}} are*

a. { φ }
b. {{φ}}, {φ}, φ
c. {φ, φ} , φ
d. {{φ} {φ}}

Q.46. *The set of rational number between 3 and 9 is*

a. Infinite set
b. Finite set
c. Countable set
d. Empty set

Q.47. *The set {0} is equivalent to the set*

a. 0
b. {φ}
c. φ
d. {0, φ}

Q.48. *If k is the number of elements of a set A, the number of elements of P(A) is*

a. k^2
b. 2k
c. 2^k
d. $(k+2)^2$

Q.49. *A = {x|x ∈ Z and 9 < 4x ≤ 33}, then A =*

a. {1,2,3.....33}
b. {10,11,12....33}
c. {4,8,16,32}
d. {3,4,5,6,7,8}

Q.50. *If A is proper subset of B, then we write*

a. $A \supseteq B$
b. $A \subset B$
c. $A \subseteq B$
d. $B \subset A$

Q.51. *If A = {x|x ∈ N, 7 < x < 8}, then A has*

a. Two elements
b. No proper subset
c. No emepty set
d. Only one element

Q.52. *{1,2,3.....} and {1, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ .....} are*

a. Equal sets
b. Additive inverse
c. Equivalent sets
d. Proper subset

Topic 2 Operations on Three Sets

Q.53. *If set A = E and set B = O, then AUB = ?*
a. ϕ
b. E
c. O
d. N

Q.54. *If set A = N and set B = E, then $A \cap B$ = ?*
a. N
b. Q
c. B
d. ϕ

Q.55. *If set S = E and set T = O, then $S \cap T$ = ?*
a. N
b. E
c. O
d. ϕ

Q.56. *If A = {1,2,3......10} and B={2,4,6.....10}, then A–B=?*
a. {1,3,5,7,9}
b. {1,2,3,4,5,6,7,8,9,10}
c. {1,2......10}
d. {2,4,6,8,10}

Q.57. *If set A = Q and set B = Q′, then AUB = ?*
a. N
b. Q
c. Q′
d. R

Q.58. *Symbolically, we can write $A \cap B$ as*
a. $\{x : x \in A \vee x \in B\}$
b. $\{x : x \notin A \wedge x \notin B\}$
c. $\{x | x \in A \wedge x \notin B\}$
d. $\{x : x \in A \wedge x \in B\}$

Q.59. *Symbolically, we can write A–B as*
a. $\{x : x \in A \wedge x \notin B\}$
b. $\{x : x \in A \vee x \in B\}$
c. $\{x : x \notin A \wedge x \in B\}$
d. $\{x | x \notin A \wedge x \notin B\}$

Q.60. *We can write B–A, symbolically as*
a. $\{x : x \in A \wedge x \in B\}$
b. $\{x | x \in A \wedge x \notin B\}$
c. $\{x : x \notin A \wedge x \in B\}$
d. $\{x | x \notin A \wedge x \notin B\}$

Q.61. *To find the complement of set A, which set is necessary?*
a. Natural number
b. Whole number
c. Universal
d. Set B

Q.62. *For any two sets A and B, $B \cap A$ = ?*
a. BUA
b. AUB
c. B–A
d. $A \cap B$

Q.63. *For any two sets A and B, (AUB)′ = ?*
a. A′UB′
b. $A' \cap B'$
c. $(A \cap B)'$
d. (A–B)′

Q.64. ***For any two sets A and B, $A' \cap B' = ?$***
a. $A' \cup B'$
b. $(A \cup B)'$
c. $(A \cup B)$
d. $(A \cap B)'$

Q.65. ***Name the property used in $A \cap (B \cap C) = (A \cap B) \cap C$***
a. Commutative property of union
b. Distributivity of union over intersection
c. Associative property of intersection
d. Commutative property of intersection

Q.66. **Name the property used in $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$**
a. Associative property of union
b. Commutative property of union
c. Distributivity of intersection over union
d. Distributivity of union over intersection

Q.67. ***For any two sets A and B, and let U be the Universal set, then $U - A = ?$***
a. B
b. B'
c. U'
d. A'

Q.68. ***For any set A, and Universal set U, $A \cup A' = ?$***
a. ϕ
b. A
c. A'
d. U

Q.69. ***For any set X and Universal set U, $X \cap X' = ?$***
a. U
b. ϕ
c. X'
d. X

Q.70. ***If $A \subseteq B$ and $B \subseteq A$, then***
a. $A = B$
b. $B \supset A$
c. $A = \phi$
d. $B = \phi$

ANSWERS

1.	d	2.	d	3.	c	4.	d	5.	c
6.	d	7.	b	8.	c	9.	d	10.	c
11.	a	12.	c	13.	c	14.	c	15.	b
16.	a	17.	c	18.	d	19.	d	20.	c
21.	c	22.	d	23.	b	24.	c	25.	c
26.	c	27.	d	28.	b	29.	c	30.	d
31.	b	32.	d	33.	b	34.	b	35.	d
36.	b	37.	a	38.	b	39.	c	40.	c
41.	c	42.	a	43.	c	44.	a	45.	c
46.	a	47.	b	48.	c	49.	d	50.	b
51.	b	52.	c	53.	d	54.	c	55.	d
56.	a	57.	d	58.	d	59.	a	60.	c
61.	c	62.	d	63.	b	64.	c	65.	c
66.	c	67.	c	68.	d	69.	b	70.	a

Q.9. For reasoning, we have to use

a. implication

b. conjunction

c. induction

d. proposition

Q.10. A daclarative statement which may be true or false but not both is called a

a. hypothesis

b. proposition

c. implication

d. conjunction

Q.11. According to Aristotle, in proposition there could be

a. one possibility

b. two possibilities

c. three possibilities

d. seven possibilties

Q.12. Deductive logic in which every statement is regarded as true or false and there is no other possibility is called:

a. deductive logic

b. inductive logic

c. Aristotlian logic

d. non-Aristotlian logic

Q.13. Logic in which there is scope of third or fourth possibility is called.

a. non-Aristotlian logic

b. Aristotlian logic

c. Postulates

d. induction logic

Q.14. $\sim p$ is the

a. implication of p

b. disjunction of p

c. negation of p

d. conjunction of p

Q.15. If P is any preposition its negation is denoted by

a. $\sim p$

b. $\vee P$

c. $\wedge p$

d. $\rightarrow p$

Q.16. If p is false, $\sim p$ is

a. true

b. not true

c. equal to p

d. conjunction

Q.17. Conjunction of two statements p and q is denoted symbolically as

a. $p \rightarrow q$

b. $p \leftrightarrow q$

c. $p \vee q$

d. $p \wedge q$

Q.18. A conjunction is considered to be true only if both its components are

a. false

b. equivalent

c. equal

d. true

Q.19. Disjunction of p and q is

a. p or q

b. p and q

c. p if q

d. p implies q

Q.20. If both p and q are false, then the disjunction of p and q is

a. false

b. true

c. equal

d. equivalent

Q.21. The disjunction of two statements p and q, is denoted symbolically as

a. $p \wedge q$

b. $p \to q$

c. $p \leftrightarrow q$

d. $p \vee q$

Q.22. 10 is a even number or 0 is a natural number, then truth value of this disjunction is

a. false

b. true

c. not discussed

d. negation of first

Q.23. The conjunction of 3>5, and 5<9, is

a. false

b. true

c. disjunction

d. unknown

Q.24. Any two propositions which is combined by the word "and" and form a compound proposition is called

a. conditional of the original proposition

b. consequent of the original proposition

c. disjunction of the original proposition

d. conjunction of the original propositoin

Q.25. Which of the following statement, is true

a. Lahore is in Punjab and 5>7

b. Lahore is the capital of Pakistan and 3<23

c. Lahore is capital of Sindh and 2+2 = 7

d. Lahore is the capital of Sindh or 2+2=4

Q.26. a_1: 5<7 and a_2:5>7, then $a_1 \wedge a_2$ is

a. false

b. true

c. not valid

d. undefine

Topic 2 Implication or Conditional

Q.27. The statements of the form "If p then q" are called

a. hypothesis

b. conditional

c. disjunction

d. conjunction

Q.28. $p \to q$ is read as

a. p and q

b. p or q

c. p implies q
d. p is equivalent to q

Q.29. *An implication of p and q is denoted by*

a. $p \leftrightarrow q$
b. $p > q$
c. $p \sim q$
d. $p \rightarrow q$

Q.30. *In $p \rightarrow q$, p is called*

a. conclusion
b. consequent
c. hypothesis
d. conditional

Q.31. *In $p \rightarrow q$, q is called*

a. hypothesis
b. implication
c. consequent
d. antecedent

Q.32. *In $p \rightarrow q$, q is called conclusion or*

a. hypothesis
b. antecedent
c. consequent
d. conditional

Q.33. *In $p \rightarrow q$, p is called antecedent or*

a. hypothesis
b. implication
c. consequent
d. conditional

Q.34. *A compound statement of the form "p is equivalent to q" is called*

a. implication
b. bicondition
c. conclusion
d. antecedent

Q.35. *The bicondition $p \leftrightarrow q$ is true, whenever p and q have the*

a. opposite truth values
b. only true truth values
c. only false truth values
d. same truth values

Q.36. *The conditional statement "If p then q" is logically equivalent to the statement*

a. not p or not q
b. not p and not q
c. not p or q
d. p or q

Q.37. *The converse of $p \rightarrow q$ is*

a. $\sim p \rightarrow \sim q$
b. $\sim p \rightarrow q$
c. $q \rightarrow p$
d. $\sim q \rightarrow p$

Q.38. *The inverse of $p \rightarrow q$ is*

a. $q \rightarrow p$
b. $\sim p \rightarrow \sim q$
c. $\sim q \rightarrow \sim p$
d. $\sim p \rightarrow q$

Q.39. *The contrapositive of $p \rightarrow q$ is*

a. $\sim p \rightarrow \sim q$
b. $q \rightarrow p$

ANSWERS

1.	b	2.	c	3.	a	4.	a	5.	c
6.	c	7.	d	8.	b	9.	d	10.	b
11.	b	12.	c	13.	a	14.	c	15.	a
16.	a	17.	d	18.	d	19.	a	20.	a
21.	d	22.	b	23.	a	24.	d	25.	d
26.	a	27.	b	28.	c	29.	d	30.	c
31.	c	32.	c	33.	a	34.	c	35.	d
36.	c	37.	c	38.	b	39.	b	40.	a
41.	a	42.	a	43.	d	44.	b	45.	c
46.	d	47.	c	48.	d	49.	d	50.	c

CHAPTER 4

FUNCTIONS & GROUPS

MULTIPLE CHOICE QUESTIONS

☆ Each question has four possible answers. Choose the correct answer and encircle it.

Topic 1 Binary Relation

Q.1. ***Let A and B be two non-empty sets, then any subset of the cartesian product AxB is called a***

a. function b. domain
c. range d. binary relation

Q.2. ***The set of cartesian product AxB consists of***

a. domain b. range
c. binary relation d. ordered pair

Q.3. ***The set of first elements of the ordered pairs forming the relation is called its***

a. domain b. range
c. ordered paris d. relation

Q.4. ***If A is non-empty set, any subset of AxA is called a relation in***

a. A b. B
c. ϕ d. r

Q.5. ***The set of second elements of the ordered pairs forming a relation is called*** a

a. Domain
b. range
c. function
d. relation

Q.6. Which of the following notation defines $A \times B$

a. $\{(a,b): a \in B \wedge b \in A\}$
b. $\{(a,b): a \in A, b \notin B\}$
c. $\{(a,b): a \notin A \wedge b \in B\}$
d. $\{(a,b): a \in A, b \in B\}$

Q.7. $(a,b) = (c,d)$ if and only if

a. $a = b$ and $c = d$
b. $a = d$ and $b = c$
c. $a = c$ and $b = d$
d. $a - b = c - d$

Q.8. If a, b represent elemtns of N, then range of the relatioin in N given by $r = \{(a,b) \mid 2a+b=10\}$ is

a. $\{8,6,4,2\}$
b. $\{\ \}$
c. $\{5,7,3\}$
d. $\{12,14,16,18\}$

Q.9. The relation $r = \{(x,y) | y = x\}$ in the set W has the domain $\{0,1,2\}$, then its range is

a. $\{0,1,4\}$
b. $\{5,6,7\}$
c. $\{0,-1,-2\}$
d. $\{0,1,2\}$

Q.10. If the number of elements in set A is n, and in set B is m, then the number of elements in $A \times B$ will

a. n^m
b. m^n
c. $m \times n$
d. $m+n$

Q.11. arb mean

a. a is related to b
b. b is related to a
c. a is reciprocal of b
d. a is not related to b

Topic 2 Functions

Q.12. A function f from A to B can be written as:

a. $f \rightarrow A:B$
b. $A:B \rightarrow f$
c. $f: A \rightarrow B$
d. $f \rightarrow A \rightarrow B$

Q.13. Function is a special type of

a. relation
b. ordered pairs
c. cartesian product
d. sets

Q.14. A function $f: A \rightarrow B$ is said to be one-to-one, if distinct elements in A have

a. similar images
b. distinct images
c. similar range
d. option a and c

Q.15. A function from A to B is called on-to function, if its range is

a. A
b. B
c. A and B
d. neither A nor B

Q.16. If no two elements of ordred pair of a function from A into B are equal,

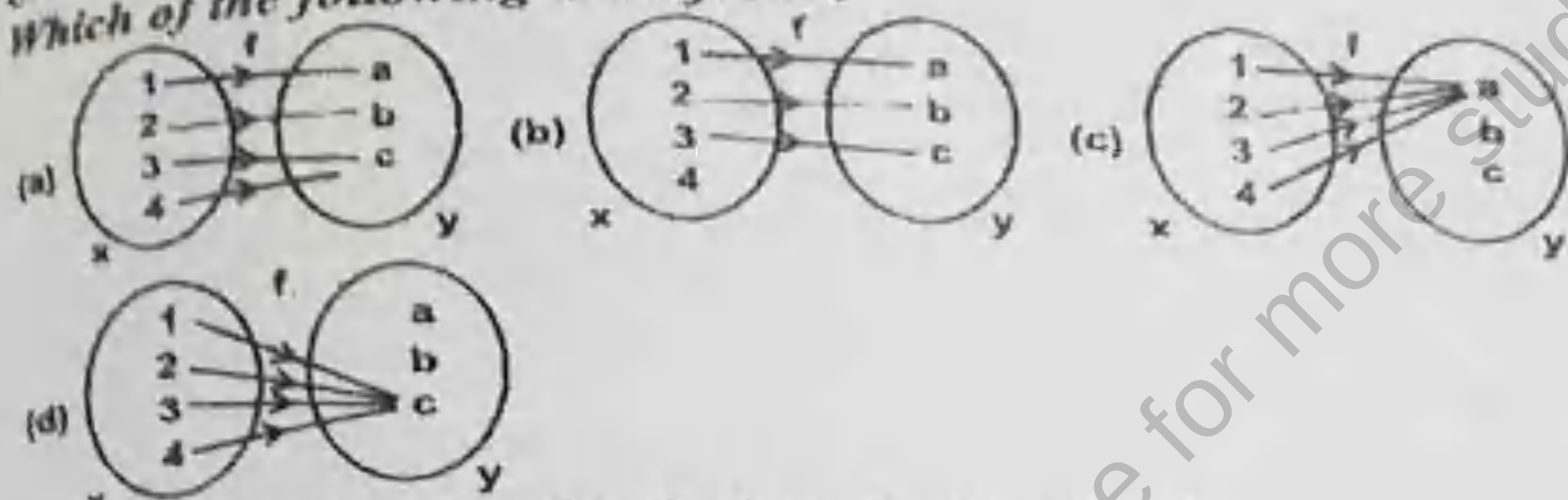
then it is called

a. surjective
b. injuctive
c. bijective
d. on to

Q.17. ***If no two elements of ordered pairs of a function from A onto B are the same, then it is called***

a. surjective
b. injuctive
c. bijective
d. on to

Q.18. ***Which of the following is surjective***



Q.19. ***If range of a function f is B, then the function is***

a. surjective
b. injuctive
c. bijective
d. into

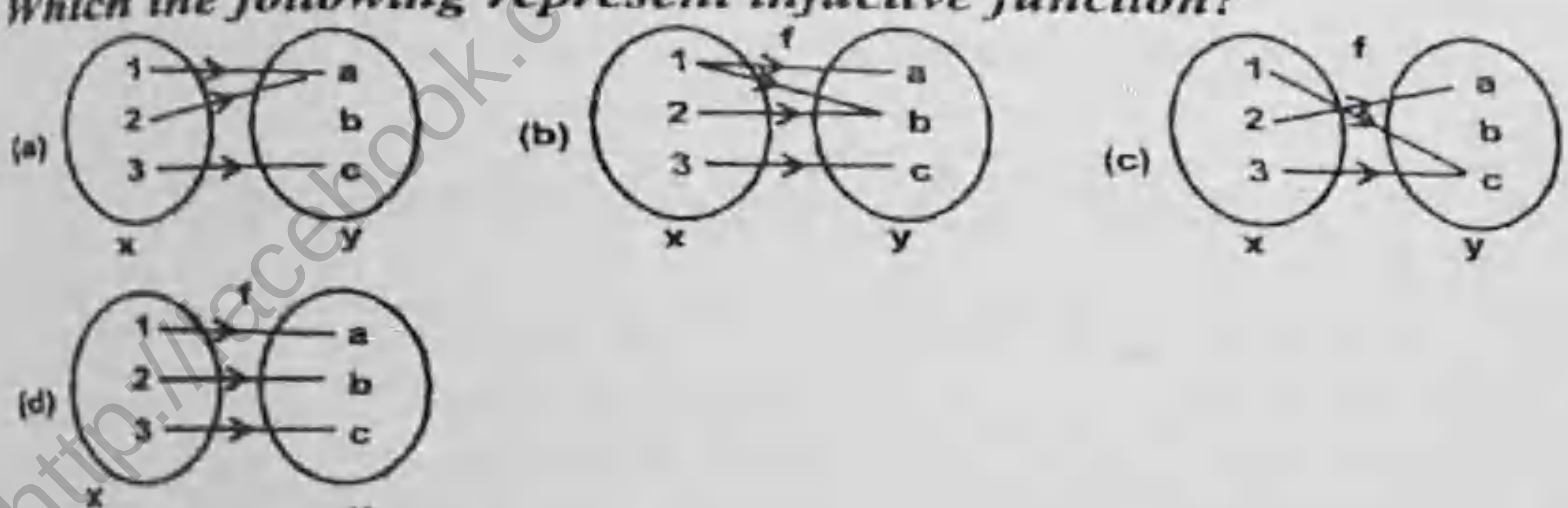
Q.20. ***The identity function is***

a. surjective
b. injuctive
c. bijective
d. into

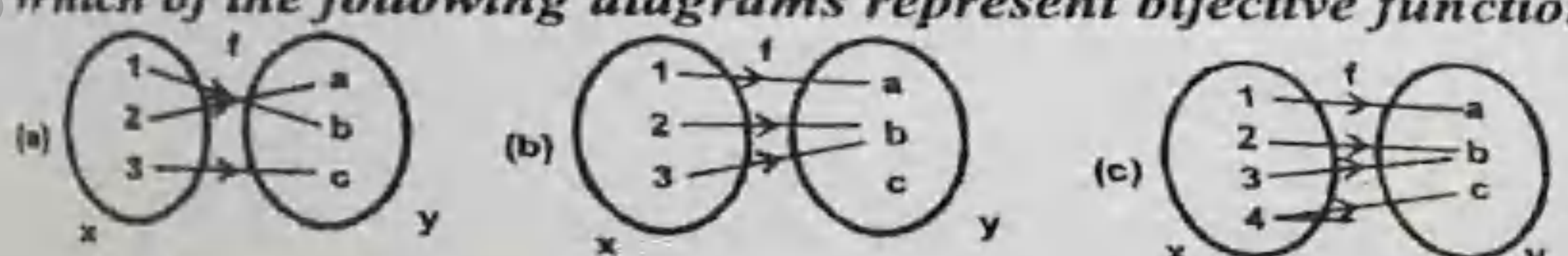
Q.21. ***Such a function which is (1-1) is called.***

a. surjective
b. injuctive
c. bijective
d. into

Q.22. ***Which the following represent injuctive function?***



Q.23. ***Which of the following diagrams represent bijective function?***



Q.31. ***Which of the following function represents parabola***

a. $y = ax^2+b$
b. $y=ax + b$
c. $y = ax - b$
d. $y = x$

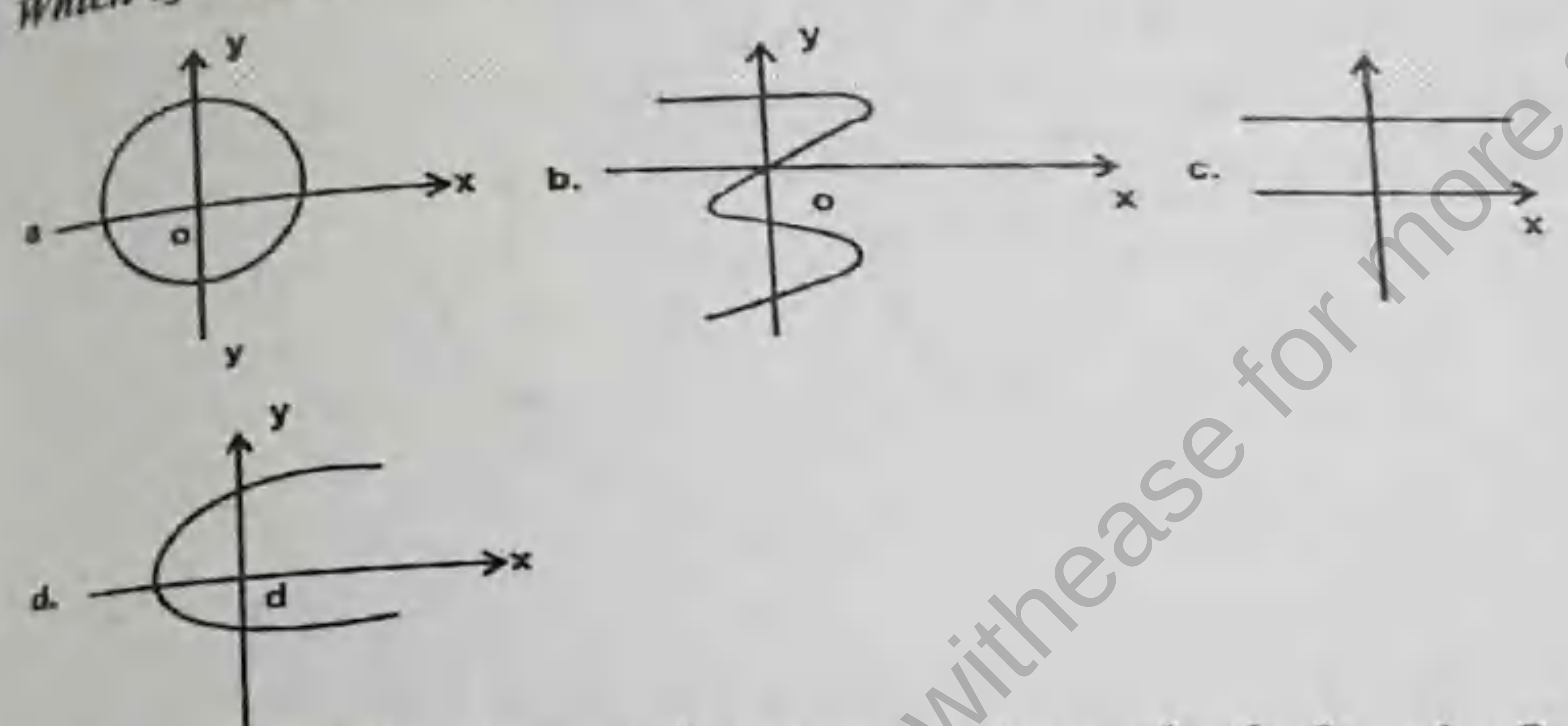
Q.32. ***If $a = 0$, in a function $y = ax+b$, then the function become***

a. linear
b. quadratic
c. inverse
d. constant

Q.33. ***The function $y = -3x + 2$, is the equation of***

a. straight line
b. parabola
c. circle
d. inverse function

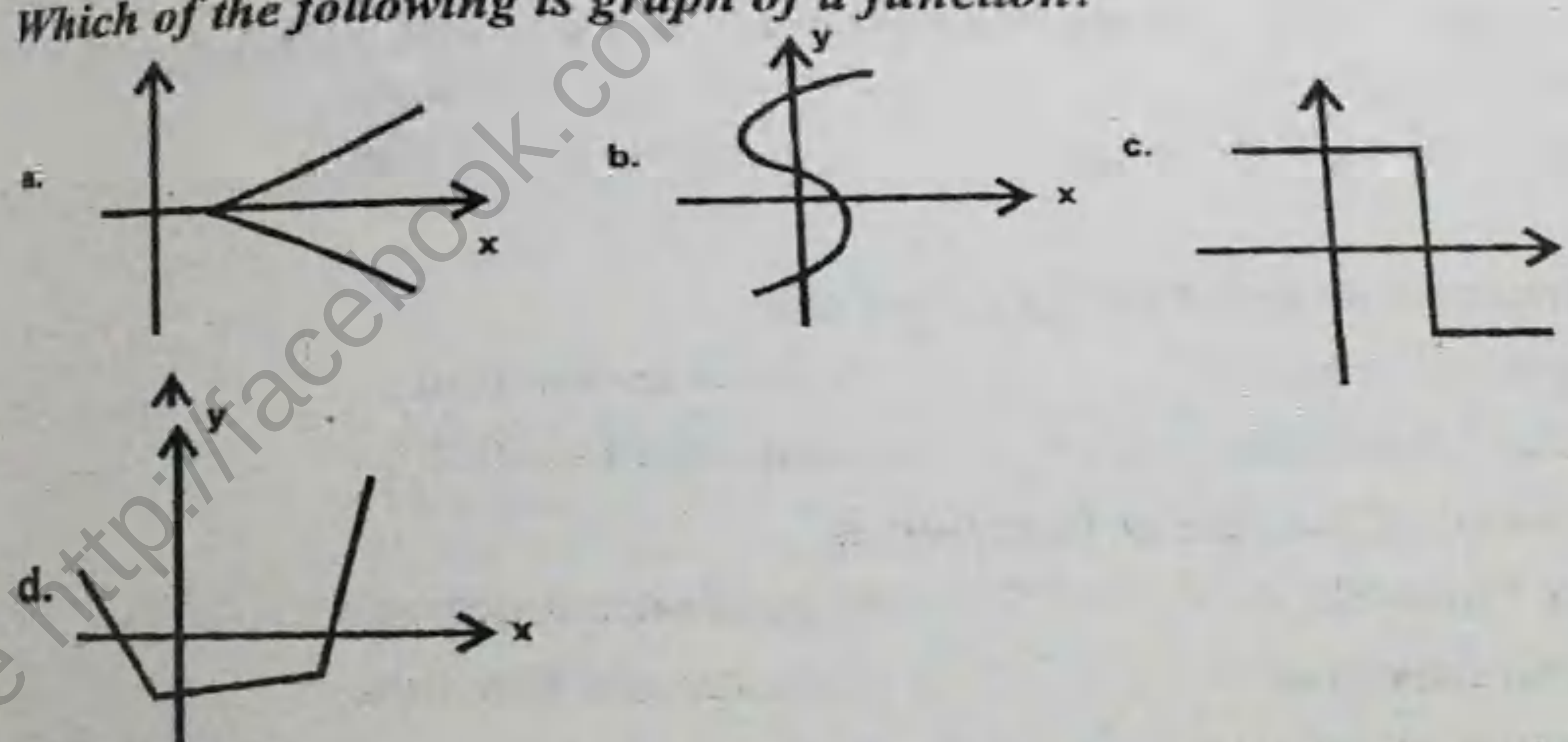
Q.34. ***Which of the following graph is the graph of a function?***

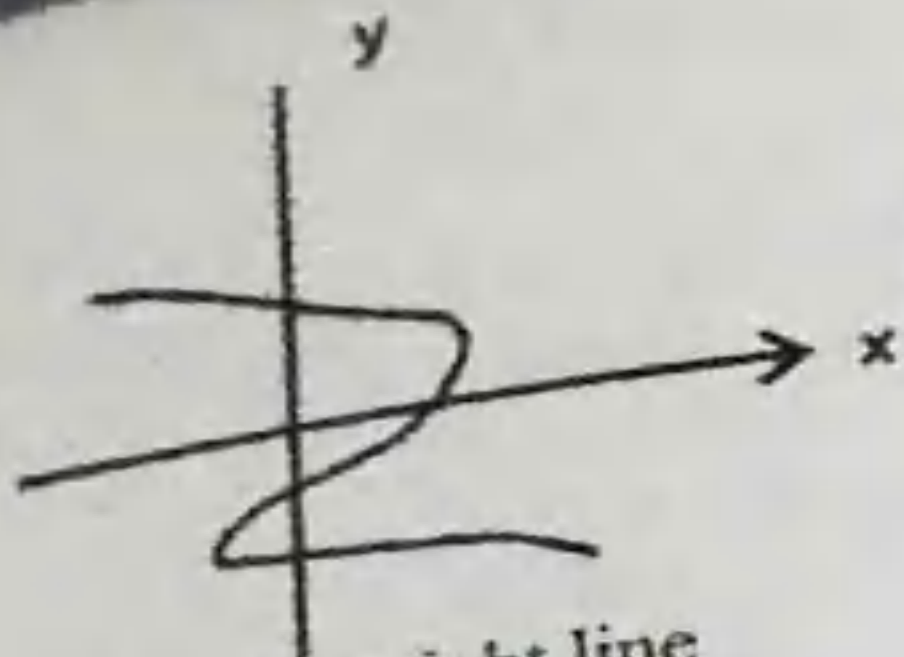


Q.35. ***Which of the followin equation represents quadratic function?***

a. $y = ax + b$
b. $y = ax^2 + bx$
c. $y = 2x$
d. $y = b$

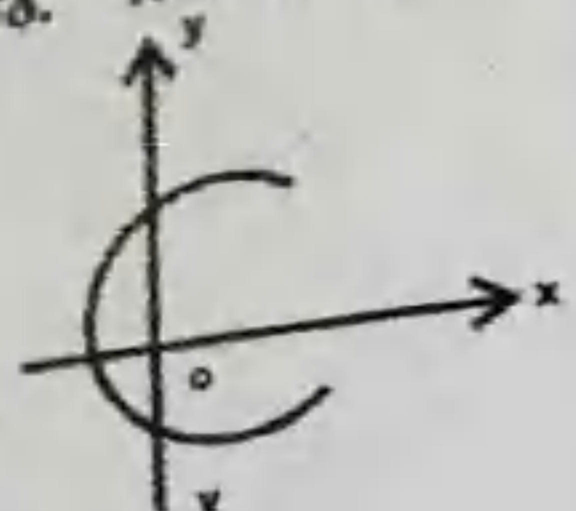
Q.36. ***Which of the following is graph of a function?***

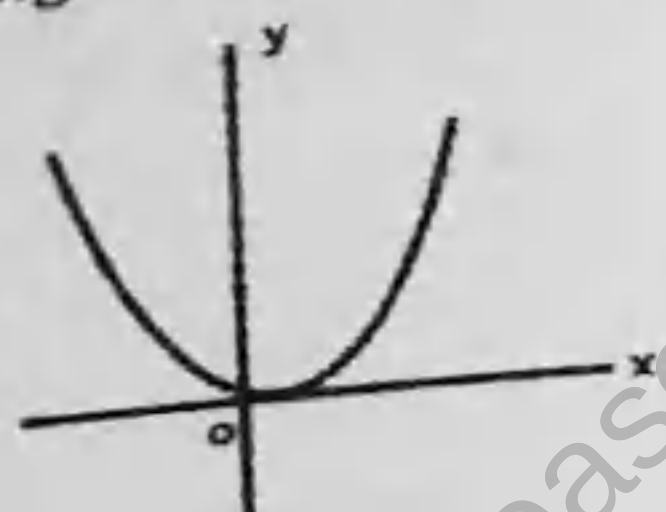


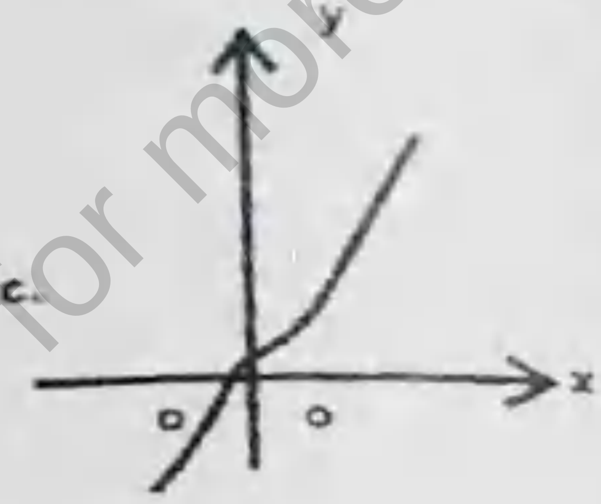
Q.37. ***The graph***  ***is not the graph of the function since***

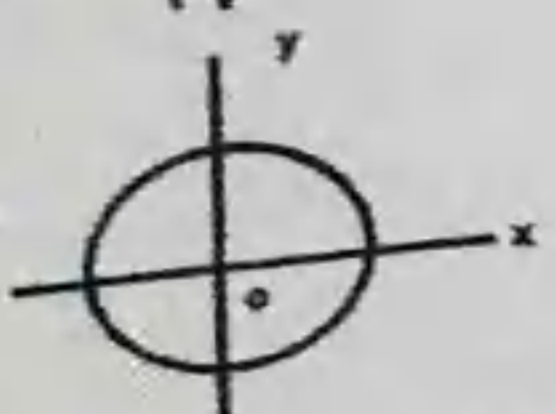
a. the graph is not a straight line
b. the graph is not parabola
c. the vertical line intersects the graph in more than one point
d. option a and b both

Q.38. ***Which of the following is the graph of one-one function?***

a. 

b. 

c. 

d. 

Topic 4 Inverse of a Function

Q.39. ***A function f will have an inverse function if and only if it is a***

a. onto function
b. into function
c. constant
d. one-one function

Q.40. ***The function denoted by $1/f$ called the***

a. reciprocal function
b. inverse function
c. constant function
d. reverse function

Q.41. ***The inverse of the linear function is***

a. linear function
b. quadratic function
c. inverse function
d. reciprocal function

Q.42. ***The inverse of a line is***

a. inverse
b. line

c. quadratic
d. circle

Q.43. ***The line $y = x$ is a***

a. self function
b. constant function
c. quadratic function
d. inverse function

Q.44. ***The function $\{(x,y)|y=x\}$ is called the***

a. self function
b. identity function
c. quadratic function
d. constant function

Q.45. ***The equation $y = \sqrt{x}$, $x>0$ defines***

a. only relation
b. a function
c. quadratic function
d. inverse function

Q.46. ***The equation $y^2 = x$, $x>0$, does not define***

a. a function
b. a relation
c. identity function
d. linear function

Q.47. ***The inverse of the function $f: x \rightarrow \frac{x-2}{3}$ is***

a. $\frac{y-2}{3}$
b. $\frac{x+2}{3}$
c. $3x+2$
d. $\frac{2x+3}{2}$

Q.48. ***There will be no inverse if the function is***

a. one-to-one
b. one-to-many
c. onto
d. into

Q.49. ***The inverse of $f(f^{-1})$ exists only if f is***

a. one-to-one
b. one-to-many
c. onto
d. into

Q.50. ***The inverse of the function $f: x \rightarrow 2x-3$ is***

a. $2y-3$
b. $2x+3$
c. $2y+3$
d. $\frac{x+3}{2}$

Topic 5 binary Operations

Q.51. ***A binary operation on a set G is a function from the set G × G to the set***

a. G
b. G x G
c. G^{-1}
d. $\frac{1}{G}$

Q.64. If $a \times (b \times c) = (a \times b) \times c$, for all $a,b,c \in S$, then binary operation $\times$ on set S is called

a. associative
b. commutative
c. identity element
d. inverse of a, b and c

Q.65. If $e \times a = a \times e = a$ for all $a \in S$, then $e \in S$ is called an

a. associative
b. commutative
c. identity element
d. inverse of a

Q.66. Identity element, if it exists, is

a. its inverse
b. unique
c. commutative
d. associative

Q.67. The inverse of 'a' is denoted by

a. $\frac{1}{a}$
b. a^{-1}
c. aa^{-1}
d. e

Q.68. An element $b \in S$, is said to be an inverse of $a \in S$, if $a \times b = b \times a =$

a. a
b. b
c. e
d. b^{-1}

Topic 6 Groups

Q.69. A closed set with respect to an operation $\times$ is called a

a. binary opeation
b. group
c. groupoid
d. semi-group

Q.70. The set {E, O}, is a

a. group
b. non-abilian group
c. semi-group
d. groupoid

Q.71. The set {1, –1, i, –i}, is groupoid w.r.t

a. addition
b. multiplication
c. subtraction
d. addition and multiplication

Q.72. A non-empty set S is semi-group if it is closed w.r.t an operation $\times$ and the operation $\times$ is

a. commutative
b. distributive
c. None of these
d. closed

Q.73. A semi-group having an identity is called a

a. groupoid
b. non-commutative
c. abelian
d. monoid

Q.74. ***The power set P(s) of a set S is a***

a. groupoid
b. monoid
c. semi-group
d. commutative

Q.75. ***The set of natural numbers, N, together with the operation of additon is a***

a. non-abelian set
b. groupoid
c. semi-group
d. commutative

ANSWERS

1.	d	2.	d	3.	a	4.	a	5.	b
6.	d	7.	c	8.	a	9.	d	10.	c
11.	a	12.	c	13.	a	14.	b	15.	b
16.	b	17.	c	18.	a	19.	a	20.	b
21.	c	22.	d	23.	a	24.	a	25.	d
26.	b	27.	c	28.	c	29.	c	30.	d
31.	a	32.	d	33.	a	34.	c	35.	b
36.	d	37.	c	38.	c	39.	d	40.	a
41.	a	42.	b	43.	a	44.	b	45.	b
46.	a	47.	c	48.	b	49.	a	50.	d
51.	a	52.	c	53.	a	54.	a	55.	c
56.	b	57.	a	58.	c	59.	c	60.	b
61.	a	62.	a	63.	d	64.	a	65.	c
66.	b	67.	b	68.	c	69.	c	70.	d
71.	b	72.	c	73.	d	74.	b	75.	c

CHAPTER 5

MATRICS & DETERMINANTS

MULTIPLE CHOICE QUESTIONS

☆ Each question has four possible answers. Choose the correct answer and encircle it.

Topic 1 Basics of Matrices

Q.1. ***The numbers used in rows or colums are said to be entries or***

a. columns b. rows

c. elements d. matrix

Q.2. ***A rectangular array of numbers in rows and columns is called a***

a. matrix b. element

c. determinants d. entries

Q.3. ***If a matrix has m rows and n columns, then mxn is called the***

a. dimension b. determinants

c. symmetric d. column matrix

Q.4. ***The order of the matrix*** $\begin{bmatrix} 1+5-3 \\ 2+7-1 \end{bmatrix}$ ***is***

a. 2x3 b. 2x2

c. 1x2 d. none of these

Q.5. ***If*** $A = \begin{bmatrix} 1 & 5 & -3 \\ 2 & 7 & -1 \end{bmatrix}$ ***then element*** a_{23} ***is***

a. −7 b. −6

c. −1 d. 6

Q.6. ***[1 −3 5] is a***

a. column matrix b. diagonal matrix

c. identity matrix d. row matrix

Q.7. $\begin{bmatrix} 0 \\ 0 \\ \varphi \end{bmatrix}$ ***is a***

a. null matrix b. column vector

c. row matrix d. identity matrix

Q.8. ***If*** $A = \{3\}$***, then order of matrix A is***

a. singular matrix
b. column matrix
c. row matrix
d. identity matrix

Q.17. *If* $A = \begin{bmatrix} 2 & -3 \\ 4 & 1 \end{bmatrix}$, *then* $A' =$

a. $\begin{bmatrix} 2 & 1 \\ -3 & 4 \end{bmatrix}$
b. $\begin{bmatrix} 1 & 3 \\ -4 & 2 \end{bmatrix}$
c. $\begin{bmatrix} 2 & 4 \\ -3 & 1 \end{bmatrix}$
d. $\begin{bmatrix} -2 & -4 \\ 3 & -1 \end{bmatrix}$

Q.18. ***If all elements in a matrix A are real, then matrix A is called***

a. identity matrix
b. null matrix
c. symmetric
d. none of these

Q.19. *If* $B = \begin{bmatrix} 2 & 1 & 5 \\ 5 & 2 & 3 \\ 3 & 1 & 2 \end{bmatrix}$, ***then the entries 2,2,2 form the***

a. rectangular matrix
b. principal diagonal
c. equality
d. identity element

Q.20. $A = \begin{bmatrix} 2+1 & 0 \\ 5+1 & 5 \end{bmatrix}$, ***is a***

a. diagonal matrix
b. null matrix
c. square matrix
d. scalar matrix

Q.21. ***Two matrices*** $A = [a_{ij}]$ ***and*** $B = [b_{ij}]$, ***are equall iff***

a. $a_{ij} = a_{ji}$
b. $a_{ij} = b_{ji}$
c. $a_{ij} = b_{ij}$
d. $b_{ij} = b_{ji}$

Q.22. ***In a diagonal matrix, all entries except in diagonal are***

a. similar
b. zero
c. one
d. real

Q.23. $\begin{bmatrix} \sqrt{2} & 0 & 0 \\ 0 & \sqrt{2} & 0 \\ 0 & 0 & \sqrt{3} \end{bmatrix}$ ***is a***

a. diagonal matrix
b. identity matrix
c. null matrix
d. idemptant

Q.24. ***Matrix*** $\begin{bmatrix} 3 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ ***is a***

a. diagonal matrix
b. identity matrix
c. scalar matrix
d. idempotant

Q.25. *If $B=[b_{ij}]$ be a square matrix of order n, and $b_{ij}=0$ for all $i \neq j$ and $b_{ij}=k$, for all $i=j$, then the matrix B is called*

a. diagonal matrix
b. scalar matrix
c. null matrix
d. identity matrix

Q.26. *$1 \times n$ matrix of the form $[a_{11}, a_{12} ... a_{1n}]$, is said to be a*

a. null matrix
b. scalar matrix
c. equal matrix
d. row matrix

Q.27. *The matrices* $\begin{bmatrix} 2 & 3 & 1 \\ 1 & 2 & 3 \end{bmatrix}$ *and* $\begin{bmatrix} 2 & 1 \\ 3 & 2 \\ 1 & 3 \end{bmatrix}$ *are*

a. equal matrices
b. column matrices
c. rectangular matrix
d. square matrices

Topic 2 Addition and Subtraction of Matrices

Q.28. Two matrices are conformable for addition, if they are

a. equal
b. adjoint
c. same order
d. disjoint

Q.29. *If* $A=\begin{bmatrix} 4 & 9 \\ 2 & 6 \end{bmatrix}$ *and* $B=\begin{bmatrix} 1 & 7 \\ 5 & 4 \end{bmatrix}$, *then A–B=*

a. $\begin{bmatrix} 5 & 2 \\ -3 & 2 \end{bmatrix}$
b. $\begin{bmatrix} 5 & 16 \\ 7 & 10 \end{bmatrix}$
c. $\begin{bmatrix} 3 & 2 \\ 3 & -2 \end{bmatrix}$
d. $\begin{bmatrix} 3 & 2 \\ -3 & 2 \end{bmatrix}$

30. *Addition and subtraction of two matrices A+B and A–B requires that the matrices be*

a. equal dimension
b. rectangular
c. square
d. identity

1. *If* $A=\begin{bmatrix} 2 & -2 & 4 \\ 0 & -3 & -4 \end{bmatrix}$ *and* $B=\begin{bmatrix} 1 & -5 & 6 \\ 4 & -2 & -3 \end{bmatrix}$, *then A+B =*

a. Not possible
b. $\begin{bmatrix} 1 & -7 & 10 \\ 4 & -5 & -7 \end{bmatrix}$
c. $\begin{bmatrix} 3 & -7 & 10 \\ 4 & -5 & -7 \end{bmatrix}$
d. $\begin{bmatrix} 3 & 3 & -2 \\ -4 & -1 & -1 \end{bmatrix}$

Topic 3 Multiplication of Matrices

Q.32. If $A = \begin{bmatrix} 3 & 6 & 24 \\ 12 & 9 & 36 \\ 6 & 15 & 18 \end{bmatrix}$, then $\frac{1}{3}A =$

a. $\begin{bmatrix} 9 & 18 & 72 \\ 36 & 27 & 108 \\ 18 & 45 & 54 \end{bmatrix}$ b. $\begin{bmatrix} 1 & 2 & 8 \\ 4 & 4 & 12 \\ 3 & 5 & 6 \end{bmatrix}$

c. $\begin{bmatrix} 1 & 2 & 8 \\ 4 & 3 & 12 \\ 2 & 5 & 6 \end{bmatrix}$ d. $\begin{bmatrix} 1 & 2 & 18 \\ 4 & 3 & 12 \\ 3 & 5 & 6 \end{bmatrix}$

Q.33. If $A = [1 \ \ -2 \ \ 3]$ and $B = \begin{bmatrix} 1 & 0 \\ 2 & -1 \\ 1 & 2 \end{bmatrix}$, then dimension of AB will be

a. 1x3 b. Not possible
c. 2x3 d. 1x2

Q.34. *Multiplication of a row vector A by a column vector B* **requires as a precondition that each** ***vector have***

a. same order b. same number of elements
c. equal elements d. transpose

Q.35. If $A = [4 \ \ 7 \ \ 2 \ \ 9]$ and $B = \begin{bmatrix} 12 \\ 1 \\ 5 \\ 6 \end{bmatrix}$, then $AB =$

a. not possible b. 119
c. 102 d. $\begin{bmatrix} 48 \\ 7 \\ 10 \\ 54 \end{bmatrix}$

Q.36. If $A = \begin{bmatrix} 1 \\ 4 \\ 3 \end{bmatrix}$ and $B = [3 \ \ 7 \ \ 1]$, we can find

a. AB b. A+B
c. A–B d. none of these

a. $\begin{bmatrix} -17 \\ 32 \end{bmatrix}$

b. $\begin{bmatrix} 0 \\ 10 \end{bmatrix}$

c. $\begin{bmatrix} -15 \\ 40 \end{bmatrix}$

d. $\begin{bmatrix} -15 \\ -40 \end{bmatrix}$

Q.51. ***If*** $A = \begin{bmatrix} 7 & 49 \\ 14 & 56 \\ 42 & 35 \end{bmatrix}$ ***then*** $\frac{2A}{7}$ =

a. $\begin{bmatrix} 2 & 7 \\ 4 & 8 \\ 12 & 5 \end{bmatrix}$

b. $\begin{bmatrix} 1 & 7 \\ 2 & 8 \\ 6 & 5 \end{bmatrix}$

c. $\begin{bmatrix} 14 & 98 \\ 28 & 112 \\ 84 & 70 \end{bmatrix}$

d. $\begin{bmatrix} 2 & 14 \\ 4 & 16 \\ 12 & 10 \end{bmatrix}$

Q.52. ***If*** $A = \begin{bmatrix} 1 & 2 & 3 \\ 9 & 1 & 11 \end{bmatrix}$, ***then*** $(A^t)^t$ =

a. A^t

b. $\frac{1}{A^t}$

c. A

d. A^{-1}

Q.53. ***If A, B and C are three matrices of same order, and (A+B)D=AD+BD, what is this property called?***

a. Right distributive property

b. Left distributive property

c. Associative property

d. Lest associative property

Q.54. ***If A is any matrix, and r is a scalar, then*** $(rA)^t$ =

a. $r^t A^t$

b. $\frac{r}{A^t}$

c. $\frac{1}{r} A^t$

d. rA^t

Q.55. ***Given A and B are matrices of order 3, then*** $(A+B)^t$ =

a. $A^t + B^t$

b. $\frac{1}{A} + \frac{1}{B}$

c. $\frac{1}{A^t} + \frac{1}{B^t}$

d. $A^{-1} + B^{-1}$

Q.56. ***If A and B are matrices, then*** $(AB)^t$ =

a. $A^t B^t$

b. $B^t A^t$

c. $\left(\frac{I}{A}\right)\left(\frac{I}{B}\right)$ d. $\frac{I}{BA}$

Q.57. ***In general, for matrix multiplication, which property is not possible?***

a. Associative b. commutative

c. Left distributive property d. Right distributive property

Q.58. ***If A is a row vector, then its transpose is a***

a. row vector b. diagonal matrix

c. identity matrix d. null matrix

Q.59. ***The transpose of a square matrix is a***

a. column matrix b. row matrix

c. inverse matrix d. none of these

Topic 5 Determinantion of a 2 x 2 Matrix

Q.60. **If** $A = \begin{bmatrix} a_{11} & a_{12} \\ c_{21} & a_{22} \end{bmatrix}$**, then** $|A| =$

a. $a_{11}a_{22} - a_{12}a_{21}$ b. $a_{12}a_{21} - a_{11}a_{12}$

c. $a_{11}a_{22} + a_{12}a_{21}$ d. $a_{11}a_{22} - a_{21}a_{12}$

Q.61. ***A matrix whose determinant is zero is said to be***

a. inverse b. adjoint

c. singular d. Non-singular

Q.62. ***A matrix whose determinant is not zero is said to be***

a. singular b. non-singular

c. adjoint d. symmetric

Q.63. $\begin{vmatrix} -7 & -3 \\ 14 & 3 \end{vmatrix} =$

a. 0 b. 84

c. 21 d. 1

Q.64. ***If*** $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$***, then A is non-singular if***

a. $ab - cd = 0$ b. $ab + cd = 0$

c. $ad + cd = 0$ d. $ad - cb \neq 0$

Q.65. ***If A is non singular, and B is an nxn matrix, such that*** $B = O_{n\times n}$***, then***

a. A b. null

c. A^{-1} d. non singular

Q.66. ***The matrix*** $A = \begin{bmatrix} 5 & 3 \\ 1 & 1 \end{bmatrix}$***, is***

a. singular b. non singular

c. symmetric d. disjoint

Q.67. *The adjoint of the matrix* $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ *is*

a. $\begin{bmatrix} -a & c \\ b & -d \end{bmatrix}$

b. $\begin{bmatrix} a & -c \\ -b & d \end{bmatrix}$

c. $\begin{bmatrix} \frac{1}{a} & -b \\ -c & \frac{1}{d} \end{bmatrix}$

d. $\begin{bmatrix} -d & c \\ b & -a \end{bmatrix}$

Q.68. ***The multiplication inverse of matrix A*** (A^{-1}) ***is***

a. $\frac{|A|}{\text{adj}A}$

b. $\frac{1}{\text{adj}A}|A|$

c. $\frac{1}{|A|}\text{adj } A$

d. $-|A|$

Q.69. *If* $A = \begin{bmatrix} 5 & 3 \\ 1 & 1 \end{bmatrix}$*, then* $A^{-1} =$

a. $\frac{1}{8}\begin{bmatrix} 1 & -3 \\ -1 & 5 \end{bmatrix}$

b. $\frac{1}{8}\begin{bmatrix} -5 & 1 \\ 3 & -1 \end{bmatrix}$

c. $\begin{bmatrix} \frac{1}{2} & -\frac{3}{2} \\ -\frac{1}{2} & \frac{5}{2} \end{bmatrix}$

d. $\frac{1}{2}\begin{bmatrix} 5 & -3 \\ -2 & 1 \end{bmatrix}$

Q.70. *If* $A = \begin{bmatrix} i & 0 \\ 1 & -i \end{bmatrix}$*, then* $A^2 =$

a. $\begin{bmatrix} i^2 & 0 \\ 0 & i^2 \end{bmatrix}$

b. $\begin{bmatrix} i^2 & 0 \\ 0 & -i^2 \end{bmatrix}$

c. $\begin{bmatrix} i^2 & 0 \\ 1 & i^2 \end{bmatrix}$

d. $\begin{bmatrix} -i^2 & 0 \\ 0 & -i^2 \end{bmatrix}$

Q.71. *If* $A^2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$*, then two different 2x2 matrices A are:*

a. $\begin{bmatrix} 3 & -1 \\ 1 & 1 \end{bmatrix} \& \begin{bmatrix} \frac{1}{4} & \frac{1}{4} \\ -\frac{3}{4} & -\frac{1}{4} \end{bmatrix}$

b. $\begin{bmatrix} 3 & -1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} \frac{1}{2} & \frac{1}{2} \\ -\frac{1}{2} & \frac{3}{2} \end{bmatrix}$

c. $\begin{bmatrix} 5 & 3 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} \frac{1}{2} & -\frac{3}{2} \\ \frac{3}{2} & \frac{5}{2} \end{bmatrix}$

d. $\begin{bmatrix} 5 & 3 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} \frac{1}{2} & -\frac{3}{2} \\ -\frac{1}{2} & \frac{5}{2} \end{bmatrix}$

Topic 6 Determinant of Order $n \geq 3$ Matrices

Q.79. If $A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$ then minor of a_{23}, that is $M_{23} =$

a. $\begin{vmatrix} a_{11} & a_{13} \\ a_{21} & a_{23} \end{vmatrix}$

b. $\begin{vmatrix} a_{21} & a_{22} \\ a_{11} & a_{12} \end{vmatrix}$

c. $\begin{vmatrix} a_{12} & a_{13} \\ a_{32} & a_{33} \end{vmatrix}$

d. $\begin{vmatrix} a_{21} & a_{23} \\ a_{11} & a_{13} \end{vmatrix}$

Q.80. Let $A = \begin{bmatrix} 1 & -2 & 3 \\ -2 & 3 & 1 \\ 4 & -3 & 2 \end{bmatrix}$, then minor a_{23}, that is $M_{23} =$

a. $\begin{vmatrix} 1 & 3 \\ -2 & 3 \end{vmatrix}$

b. $\begin{vmatrix} 4 & 1 \\ 1 & 2 \end{vmatrix}$

c. $\begin{vmatrix} 1 & -3 \\ -2 & 3 \end{vmatrix}$

d. $\begin{vmatrix} -2 & 1 \\ 4 & 2 \end{vmatrix}$

Q.81. Let $A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$, then minor of a_{31}, that is $M_{31} =$

a. $\begin{vmatrix} a_{11} & a_{12} \\ a_{31} & a_{32} \end{vmatrix}$

b. $\begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix}$

c. $\begin{vmatrix} a_{12} & a_{13} \\ a_{22} & a_{23} \end{vmatrix}$

d. $\begin{vmatrix} a_{21} & a_{22} \\ a_{11} & a_{12} \end{vmatrix}$

Q.82. *The cofactor of an element a_{ij} denoted by A_{ij} is defined by*

a. $A_{ij} = (+1)^{i+j} \times M_{ij}$

b. $A_{ij} = (-1)^{i+j} \times -M_{ij}$

c. $A_{ij} = (-1)^{i-j} \times M_{ij}$

d. $A_{ij} = (-1)^{i+j} \times M_{ij}$

Q.83. If $A = \begin{bmatrix} 1 & -2 & 3 \\ -2 & 3 & 1 \\ 4 & -3 & 2 \end{bmatrix}$, then cofactor $A_{32} =$

a. -7

b. 8

c. -10

d. -7

Q.84. *If* $A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$, *then cofactor* $A_{33} =$

a. $\begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix}$

b. $\begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix}$

c. $\begin{vmatrix} a_{12} & a_{13} \\ a_{32} & a_{33} \end{vmatrix}$

d. $\begin{vmatrix} a_{11} & a_{13} \\ a_{31} & a_{33} \end{vmatrix}$

Q.85. ***If in a square matrix A, two rows or two columns are interchanged the determinant of the resulting matrix is***

a. $|A|$

b. $\frac{1}{|A|}$

c. A^{-1}

d. $-|A|$

Q.86. ***If a square matrix has two identical rows or two idential columns, then*** $|A| =$

a. A

b. A^{-1}

c. $\frac{1}{A^{-2}}$

d. 0

Q.87. $\begin{vmatrix} 13 & 16 & 19 \\ 14 & 17 & 20 \\ 15 & 17 & 21 \end{vmatrix} =$

a. 0

b. 27

c. 1

d. 3

Q.88. $\begin{bmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{bmatrix} =$

a. 0

b. $(a-b)^3$

c. $(1-a)^a$

d. $(a-b)(b-c)(c-a)$

Q.89. $\begin{bmatrix} b+c & a & a^2 \\ c+a & b & b^2 \\ a+b & c & c^2 \end{bmatrix} =$

a. 0

b. $(a+b+c)$

c. $(a+b+c)(a-b)(b-c)(c-a)$

d. $(a+b-c)(a+b)(b-c)(c-a)$

Q.90. $\begin{vmatrix} \alpha & \beta+\gamma & 1 \\ \beta & \gamma+\alpha & 1 \\ \gamma & \alpha+\beta & 1 \end{vmatrix} =$

a. 0
b. $(\alpha+\beta+\gamma)$
c. $(\alpha+\beta+\gamma)(1-\alpha)$
d. $(\alpha+\beta+\gamma)(\alpha-\beta)(\alpha-\gamma)$

Q.91. $\begin{vmatrix} 2a & 2b & 2c \\ a+b & 2b & b+c \\ a+c & b+c & 2c \end{vmatrix} =$

a. 0
b. $(a+b)(b+c)(c+a)$
c. $2(a+b)(b+c)(c+a)$
d. $2(abc)$

Q.92. $\begin{vmatrix} 1^2 & 2^2 & 3^2 \\ 2^2 & 3^2 & 4^2 \\ 3^2 & 4^2 & 5^2 \end{vmatrix} =$

a. 16
b. 0
c. 8
d. 2^2

Q.93. $\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} =$

a. 0
b. $(a+b+c)$
c. abc
d. $4abc$

Q.94. $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+x & 1 \\ 1 & 1 & 1+y \end{vmatrix} =$

a. 0
b. 1
c. $(1+x)(1+y)$
d. $2xy$

Q.95. $\begin{vmatrix} r\cos\theta & 1 & -\sin\theta \\ 0 & 1 & 0 \\ r\sin\theta & 0 & \cos\theta \end{vmatrix} =$

a. 0
b. 1
c. -1
d. r

c. $\begin{bmatrix} -\frac{11}{27} & \frac{1}{27} & \frac{3}{27} \\ \frac{5}{27} & \frac{2}{27} & -\frac{6}{27} \\ -\frac{2}{27} & \frac{10}{27} & -\frac{3}{27} \end{bmatrix}$

d. $\begin{bmatrix} \frac{11}{27} & -\frac{1}{27} & \frac{1}{9} \\ \frac{5}{27} & \frac{2}{27} & -\frac{2}{9} \\ -\frac{2}{27} & \frac{10}{27} & -\frac{1}{9} \end{bmatrix}$

Q.100. *If* $A = \begin{vmatrix} 4 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & 3 \end{vmatrix}$, *then* $A_{11} =$

a. 6
b. 8
c. 5
d. -6

ANSWERS

1.	c	2.	a	3.	a	4.	d	5.	c
6.	d	7.	b	8.	c	9.	d	10.	b
11.	d	12.	d	13.	b	14.	d	15.	c
16.	c	17.	c	18.	d	19.	b	20.	c
21.	c	22.	b	23.	a	24.	c	25.	b
26.	d	27.	c	28.	c	29.	d	30.	a
31.	c	32.	c	33.	d	34.	b	35.	b
36.	d	37.	b	38.	c	39.	a	40.	c
41.	a	42.	b	43.	a	44.	a	45.	a
46.	c	47.	c	48.	d	49.	c	50.	c
51.	c	52.	c	53.	a	54.	d	55.	a
56.	b	57.	b	58.	c	59.	d	60.	a
61.	c	62.	b	63.	a	64.	d	65.	b
66.	a	67.	c	68.	c	69.	c	70.	a
71.	d	72.	d	73.	c	74.	d	75.	a
76.	c	77.	d	78.	d	79.	d	80.	b
81.	b	82.	d	83.	a	84.	a	85.	d
86.	d	87.	a	88.	d	89.	c	90.	a
91.	a	92.	c	93.	d	94.	c	95.	d
96.	d	97.	d	98.	d	99.	d	100.	d

CHAPTER 6

QUADRATIC EQUATIONS

MULTIPLE CHOICE QUESTIONS

* Each question has four possible answers. Choose the correct answer and encircle it.

Topic 1 Quadratic Equation

Q.1. ***A quadratic equation in x is an equation that can be written in the form***

a. $ax+b=0$
b. $ax^3+bx^2+c=0$
c. $ax^2+bx+c=0$
d. $ax^3+bx^3+cx=0$

Q.2 ***Another name of quadratic equation is***

a. polynomial
b. 2nd degree polynomial
c. linear equation
d. simaltaneous equations

Q.3. ***A quadratic equation has two***

a. roots
b. degree
c. variables
d. constants

Q.4. ***The roots of the equation $x^2+6x-7=0$, are***

a. 1
b. 2
c. 1 and −7
d. −7

Q.5. ***The quadratic formula is***

a. $x=\dfrac{a\pm\sqrt{b^2-4ac}}{2a}$
b. $x=\dfrac{-a\pm\sqrt{b^2-4ac}}{2a}$
c. $x=\dfrac{b\pm\sqrt{b^2-4ac}}{2a}$
d. $x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$

Q.6. ***The largest degree of the terms in the poly- nomials is called***

a. term of the polynomial
b. degree of a polynomial
c. co-efficient
d. monomial

Q.7. ***The solution of the quadratic equation $x^2-7x+10=0$, is***

a. 2
b. 5
c. 2, 5
d. 7

Q.8. ***The graph of the quadratic equation is***

a. straight line

b. circle

c. parabola

d. ellipse

Q.9. *In quadratic equation $f(x) = ax^2$, if $a<0$, then the graph of parabola*

a. opens up

b. opens down

c. close up

d. symmetric w.r.t. x-axis

Q.10. *In quadratic equation $y=ax^2+bx+c$, if b and c are both zero then the graph is*

a. symmetric w.r.t. y-axis

b. symmetric w.r.t. x-axis

c. straight line

d. circle

Q.11. *In quadratic equation, if the replacement of y with -y leaves the equation unchanged, then the graph is*

a. straight line

b. circle

c. hyperbola

d. symmetric w.r.t.

Q.12. *The roots of the quadratic equation are*

a. 3

b. 2

c. 1

d. 4

Q.13. *If a parabola opens down, then its vertex is at the*

a. right of the parabola

b. left of the parabola

c. lowest point on the parabola

d. highest point on the parabola

Q.14. *If $f(x)=ax^2$, and $a>0$, then the lowest point on the parabola is called*

a. vertex of parabola

b. co-ordinates of parabola

c. roots of the equation

d. coefficient of the equation

Topic 2 Maximum or Minimum Value of a Quadratic Equation

Q.15. *The standard parabolic form of the equation $f(x)=x^2+4x+1$, is*

a. $x(x+4)+1$

b. $(x+2)^2-3$

c. $(x+4)^2-4$

d. $x(x-2)^2+1$

Q.16. *The equation ax^2+bx+c, can be written in standard parabolic form as*

a. $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

b. $y=(x-h)^2+k$

c. $y-k=(x-h)^2$

d. $y=a(x-h)^2$

Q.17. *The standard form of the quadratic function $f(x)=-x^2+4x+2$, is*

a. $(x-2)^2+6$

b. $-(x-2)^2+6$

c. 8

d. -8

Q.27. ***The equation whose roots are2, -3 and $\frac{7}{5}$ is***

a. $5x^3-2x^2-37x+42=0$

b. $2x^2+3x+7=0$

c. $-3x^2+2x+\frac{7}{5}$

d. $2x^3-3x^2-7x+5=0$

Q.28. ***If $3x^4+4x^3+x^{-5}$ is divided by $x+1$, which of the following is the remainder***

a. 7

b. -7

c. 6

d. 1

Q.29. ***Which of the following is a factor of x^n+a^n, where n is an odd integer***

a. $x-a$

b. $x+a$

c. $2x-a$

d. $2x+a$

Q.30. ***If $x-2$ and $x-1$ both are factors of $x^3-3x^2+2x-4p$, then P must equal to***

a. 1

b. 2

c. 0

d. -2

Q.31. ***f x^4+x^2+x+2 is divided by $x+2$, the remainder is***

a. 18

b. 22

c. 17

d. 21

Q. 32. ***r what value of P is x^2-Px+P divisible of $x-P$?***

a. 1

b. -1

c. $-1/2$

d. 0

Q.33. ***I $P(x)=x^4-13x^2+36$, and $P(a)=0$, then a equals***

a. 1

b. 2

c. -1

d. -2

Q.34. ***If $x-1$ is a factor of x^2+Px-4, then P has the value***

a. 4

b. 1

c. 3

d. 5

Q. 35. ***Which of the following is a factor of x^3+2x^2-5x-6***

a. $(x+2)$

b. $(x-2)$

c. $x+7$

d. $x-7$

Q.36. ***Which of the following is a factor of x^4-25x^2+144***

a. $x-7$

b. $x-9$

c. $x+3$

d. $x-3$

Q.37. ***If one root is twice the other root in the equation $3x^2+Px+54=0$, then value of P is***

a. ± 27
b. ± 9
c. ± 51
d. ± 25

Q.38. *If two roots of $8x^4-14x^3-9x^2+11x-2=0$, are -1 and 2 then other roots are*
a. ± 3
b. ± 5
c. $\pm \sqrt{5}$
d. $\pm \sqrt{3}$

Q.39. *The synthetic division method is only used to divide a polynomial by*
a. quadratic equation
b. binomial
c. linear equation
d. monomial

Q.40. *If a polynomial $P(x)$ is divided by $x-c$, then the remainder is*
a. $P(x)$
b. $x-c$
c. x
d. $P(c)$

Q.41. *A polynomial $P(x)$ has a factor $(x-a)$ if $P(a) =$*
a. a
b. x
c. 1
d. 0

Q.42. *Which of the following is the factor of $x^4+x^3-21x^2-x+20$*
a. $x+3$
b. $x+2$
c. $x-2$
d. $x-5$

Q.43. *If $(x+1)$ and $(x-2)$ are factors of x^3-Px^2+qx+2, then $P+q=$*
a. -2
b. 1
c. -1
d. 3

Q.44. *What value of x is the solution of the polynomial $x^3-28x-48=0$*
a. 4
b. -4
c. 2
d. -2

Q.45. *If $f(x)=3x^2+Px-2$, and $f(-2)=2$, then $P=$*
a. 4
b. 5
c. 6
d. 3

Q.46. *Which of the following is not the factor of x^4-13x^2+36*
a. $x+5$
b. $(x-2)$
c. $(x+2)$
d. $x+3$

Q.47. *When the polynomial Px^2+2x^3+qx+c, is divided by $x+1$ and $x-2$ the remainder remains same, then $P+q=$*

a. 3

b. −2

c. −6

d. 6

Topic 4 Cube Roots of Unity

Q.48. *If ω is the complex cube root of unity, then ω^3 =*

a. 0

b. ω

c. 1

d. ω^2

Q.49. *Each complex cube root of unity is square of*

a. itself

b. 1

c. −1

d. the other

Q.50. *If ω is the complex cube root of unity, then ω^{-12} =*

a. $\frac{1}{\omega}$

b. ω

c. −1

d. 1

Q.51. *Product of the complex cube roots of unity is equal to*

a. i

b. $-i$

c. −1

d. 1

Q.52. *If $\omega = \frac{-1+\sqrt{3}\,i}{2}$ then ω^2 =*

a. 1

b. $-i$

c. $\frac{-1-\sqrt{3}\,i}{2}$

d. $\frac{1-\sqrt{3}\,i}{2}$

Q.53. *If $\frac{-1+\sqrt{3}\,i}{2}$ and 1 are two cube roots of unity, then third is*

a. −1

b. 1

c. i

d. none of these

Q.54. $(x+y)(x+\omega y)(x+\omega^2 y) =$

a. x^2+y^2

b. x^3+y^3

c. x^2-y^2

d. x^3-y^3

Q.55. *Sum of all the four fourth roots of unity is*

a. 1

b. −1

c. i

d. $-i$

Q.56. $\left(1+\sqrt{-3}\right)^5+\left(-1-\sqrt{3}\right)^5$

a. 40

b. -32

40.	d	41.	d	42.	d	43.	c	44.	b
45.	a	46.	a	47.	c	48.	c	49.	d
50.	d	51.	d	52.	c	53.	d	54.	b
55.	c	56.	b	57.	c	58.	c	59.	a
60.	d	61.	d	62.	b				

CHAPTER 7
PARTIAL FRACTIONS

MULTIPLE CHOICE QUESTIONS

☆ **Each question has four possible answers. Choose the correct answer and encircle it.**

Q.1. $\dfrac{x^3 - x^2 + x + 1}{x^2 + 5}$ *is a*

a. Proper Rational Fraction
b. Improper Rational Fraction
c. Infinite Rational Fraction
d. Finite Rational Fraction

Q.2. $\dfrac{3x^2 + 1}{x - 2} =$

a. $13 + \dfrac{3x+6}{x-2}$
b. $3x+6 - \dfrac{13}{x-2}$
c. $3x+13+\dfrac{6}{x-2}$
d. $3x+6+\dfrac{13}{x-2}$

Q.3. ***When rational fraction is separated into partial fractions, the result is***

a. an identity
b. a fraction
c. a partial sum
d. improper fraction

Q.4. $\dfrac{ax^2}{x^3 - 1}$ **is a**

a. polynomial
b. algebraic equation
c. proper fraction
d. improper fraction

Q.5. **An improper rational fraction can be reduced by division to a**

a. proper fraction
b. polynomial
c. mixed form
d. monomial

Q.6. ***To express a single rational fraction as a sum of two or more single rational fracctions which are called***

a. improper fractions
b. partial fractions
c. mixed form
d. polynomials

Q.7. **An equation which hold good for all values of the variables is called**
a. identity
b. fraction
c. mixed form
d. partial equation

Q.8. **If $\frac{7x+25}{(x+3)(x+4)} = \frac{4}{x+3} + \frac{B}{x+4}$, then the value of B is**
a. 3
b. 4
c. –3
d. –4

Q.9. $\frac{23x-11x^2}{(2x-1)(9-x^2)} =$
a. $\frac{1}{2x-1} + \frac{4}{9-x^2}$
b. $\frac{1}{2x-1} + \frac{11}{9-x^2}$
c. $\frac{1}{2x-1} + \frac{4}{3+x}$
d. $\frac{1}{2x-1} + \frac{4}{3+x} - \frac{1}{3-x}$

Q.10. $\frac{5x-11}{2x^2+x-6} =$
a. $\frac{3}{x+2} - \frac{1}{2x-3}$
b. $\frac{1}{x+2} - \frac{3}{2x-3}$
c. $\frac{4}{x+2} + \frac{7}{2x-3}$

ANSWERS

1.	b	2.	d	3.	a	4.	c	5.	c
6.	b	7.	a	8.	a	9.	d	10.	a

CHAPTER 8
SEQUENCES & SERIES

MULTIPLE CHOICE QUESTIONS

* Each question has four possible answers. Choose the correct answer and encircle it.

Topic 1 Basics of Sequences

Q.1. ***Sequences also called ....***

a. series
b. function
c. progressions
d. elements

Q.2. ***A sequence is a function whose domain is a subset of the set of***

a. natural numbers
b. real numbers
c. whole numbers
d. rational numbers

Q.3. ***If all members of a sequence are real numbers then it is called a***

a. series
b. function
c. real sequence
d. range

Q.4. ***A sequence having no last term is called***

a. arithmetic sequence
b. geometric sequence
c. finite sequence
d. infinite sequence

Q.5. ***If the domain of a sequence is finite set then the sequence is called***

a. geometric sequences
b. infinite sequence
c. finite sequence
d. arithmetic sequence

Q.6. $1, \frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \frac{1}{9}$ ***...... is a***

a. geometric sequence
b. finite sequence
c. infinite sequence
d. arithmetic series

Q.7. ***The elements in the range of a sequence are called***

a. series
b. progression
c. members
d. terms

Q.8. ***The 6th term of the sequence 7,9,12,16...... is***

a. 27
b. 32
c. 20
d. 19

Q.9. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}$ ***........ is***

a. a geometric sequence
b. an arithmetric series
c. a finite sequence
d. an infinite sequence

Q.10. ***If*** $a_1 = 2$ ***and*** $a_n = \frac{a_n - 1}{2}$, ***then the fourth term of the sequence is***

a. 0
b. 1
c. $\frac{1}{2}$
d. $\frac{1}{4}$

Q.11. ***The sum of the terms of a sequence is called***

a. series
b. finite sequence
c. geometric sequence
d. arithmetic sequence

Q.12. ***The first four terms of a sequence are 1, −3, 5, −7. The fifth term is***

a. −11
b. 9

Q.21. *If $a_{n-2} = 3n - 11$, then the nth term of the sequence is*

a. $3n-5$
b. $3n+5$
c. $3n+1$
d. $3n-1$

Q.22. *The common difference of the sequence 2, $1\frac{1}{2}$ ..... is*

a. 1
b. $-\frac{1}{2}$
c. $\frac{3}{2}$
d. $\frac{1}{2}$

Q.23. *The fifth term of the sequence 2, $\frac{3}{2}$, ... is*

a. 1
b. $\frac{7}{2}$
c. -1
d. 0

Q.24. *The fifth term of an A.P. whose first term is 5 and common difference is 3, is*

a. 20
b. 17
c. 25
d. 30

Q.25. *The seventh term of an A.P whose first term is P and common difference is q, is*

a. $P-6q$
b. $P+6q$
c. $P-4q$
d. $P-nq$

Q.26. *The sum of first twenty odd integers in A.P is*

a. 400
b. 397
c. 404
d. 408

Q.27. *The 31 term of the A.P. 5,2,–1...... is*

a. -82
b. 82
c. 85
d. -85

Q.28. *The 26th term of the A.P. –2, –4, 10,....... is*

a. 136
b. -136
c. 148
d. -148

Q.29. *If $a_6 = 19$, $a_9 = 31$ are the 6th and 9th term of an A.P. and $d = 4$ is the common difference, then 18th term of the sequence is*

a. 65
b. 67
c. 71
d. 75

Q.30. *How many terms are there in the A.P , in which $a_1 = 11$, $a_n = 68$, $d = 3$*

a. 30
b. 27

c. 20 d. 21

Q.31. ***The nth term of an A.P., is 12−4n. Its common difference is***

a. 8 b. 4

c. −4 d. 16

Q.32. ***The next three terms of the following arithmetic progression x+y, x−y, x−3y...... are***

a. $x-5y, 3x-7y, -7x-9y$ b. $-x+3y, -9x+y, -x-7y$

c. $x-4y, x-5y, x-6y$ d. $x-5y, x-7y, x-9y$

Q.33. ***The 14th term of the sequence*** $a_n = \frac{n(n+3)}{n+1}$ ***is***

a. $\frac{208}{14}$ b. $\frac{283}{14}$

c. $\frac{238}{15}$ d. $\frac{227}{15}$

Q.35. ***The 7th term of the A.P.: 7,11,15 is***

a. 24 b. 31

c. 26 d. 23

Q.36. ***The*** a_4 ***of the A.P.:*** $\frac{3}{4}, 2, \frac{13}{4}$ .... ***is***

a. $\frac{23}{4}$ b. 12

c. 7 d. $\frac{9}{2}$

Q.37. ***If*** $S_n = 3n^2 + 2n$, ***in an arithmetic series, then first three terms of the sequence is***

a. 5, 11, 17 b. 5, 13, 21

c. 5, 9, 13 d. 5, 15, 25

Q.38. ***The nth term of the sequence*** $\left(\frac{4}{3}\right)^2, \left(\frac{7}{3}\right)^2, \left(\frac{10}{3}\right)^2 \cdots$ ***is***

a. $\frac{(3n+1)^2}{3}$ b. $\frac{3n^2+1}{9}$

c. $\left(\frac{3n+1}{3}\right)^2$ d. $\frac{(3n-1)^2}{3}$

Q.39. ***If a, b, c are in arithmetic progression, then*** $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ ***are in***

a. A.M b. G.M

c. H.M d. G.P

Q.40. ***If 6th term of a series in A.P. is −2, and 8th term is −8, the first term of the series is***

a. 13
b. −13
c. 10
d. −10

Q.41. ***If $\frac{1}{a}$, $\frac{1}{b}$ and $\frac{1}{c}$ are in A.P., then the common difference is***

a. $\frac{a-b}{2ab}$
b. $\frac{b-c}{2bc}$
c. $\frac{a-c}{2ac}$
d. $\frac{c-a}{2ac}$

Q.42. ***If $a_1 = 3$, $d = 7$ and $a_n = 59$, then the number of terms in A.P. is***

a. 7
b. 9
c. 11
d. 13

Q.43. ***If $a_{n-1} = 2n-5$, then the nth term of the sequence is***

a. 2n+1
b. 3n+2
c. 2n+3
d. 2n+5

Topic 3 Arithmetic Mean

Q.44. ***A number A is said to be the A.M between the two numbers a and b if a, A, b are in***

a. A,M
b. A.P
c. G.P
d. G.M

Q.45. ***The A.M between a_{n-1} and a_{n+1} is:***

a. $\frac{a+b}{2}$
b. $a_{n+1} - a_{n-1}$
c. $\frac{a_{n+1} - a_{n-1}}{2}$
d. $\frac{a_{n-1} - a_{n+1}}{2}$

Q.46. ***If A is the A.M between the two numbers a and b, then A−a is equal to***

a. a−A
b. A+a
c. A−b
d. b−A

Q.47. ***The A.Ms between $\sqrt{2}$ and $3\sqrt{2}$ is***

a. $2\sqrt{2}$
b. $-2\sqrt{2}$
c. $4\sqrt{2}$
d. $\sqrt{2}$

Q.48. ***The n A.Ms between a and b is.***

c. 3 and 11

d. −7 and 2

Q.57. ***If*** $-\frac{25}{2}$, -7 ***and*** $-\frac{3}{2}$ ***are three A.Ms between a and b, then a and b is equal to***

a. −25 and −3

b. $-\frac{5}{\sqrt{2}}$ and $\frac{\sqrt{3}}{\sqrt{2}}$

c. −14 and 11

d. −18 and 4

ANSWERS

1.	c	2.	a	3.	c	4.	d	5.	c
6.	c	7.	d	8.	a	9.	d	10.	d
11.	a	12.	b	13.	d	14.	b	15.	d
16.	a	17.	c	18.	d	19.	d	20.	d
21.	a	22.	b	23.	d	24.	b	25.	b
26.	a	27.	d	28.	c	29.	b	30.	c
31.	c	32.	d	33.	c	34.		35.	b
36.	d	37.	a	38.	c	39.	d	40.	a
41.	c	42.	b	43.	a	44.	b	45.	d
46.	d	47.	a	48.	b	49.	d	50.	c
51.	c	52.	c	53.	d	54.	a	55.	d
56.	c	57.	d						

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