MATHEMATICS
WORKSHEET_130924
CHAPTER 05 LINEAR INEQUALITIES

SUBJECT: MATHEMATICS **MAX. MARKS : 40**

CLASS : XI **DURATION : 1½ hrs**

General Instructions:

(i). **All** questions are compulsory.

(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.

(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.

(iv). There is no overall choice.

(v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

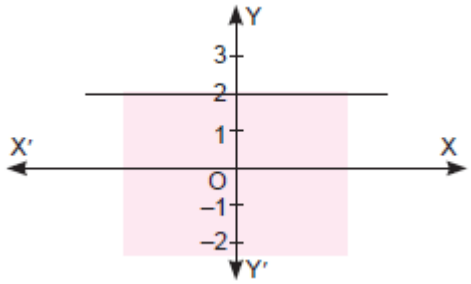
1. If $-3x + 17 < -13$, then

(a) $x \in (10, \infty)$ (b) $x \in [10, \infty)$ (c) $x \in (-\infty, 10]$ (d) $x \in [-10, 10)$

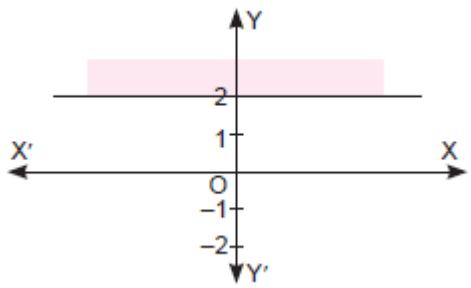
Ans. (a) $x \in (10, \infty)$

2. Solution s et of $y \leq 2$ graphically is

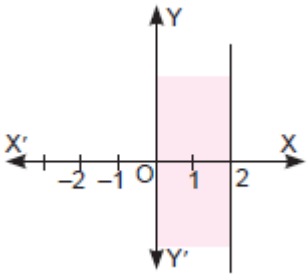
(a)



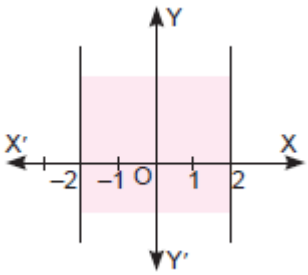
(b)



(c)



(d)



3. If $|3 - 6x| \geq 9$, then $x \in$

(a) $(-\infty, -1) \cup (3, \infty)$ (b) $(-\infty, 1] \cup (2, \infty)$

(c) $(-\infty, -1) \cup (0, \infty)$ (d) $(-\infty, -1) \cup (2, \infty)$

4. If x is a real number and $|x| < 3$, then x lies between:

(a) $x \geq 3$ (b) $x \leq -3$ (c) $-3 \leq x \leq 3$ (d) $-3 < x < 3$

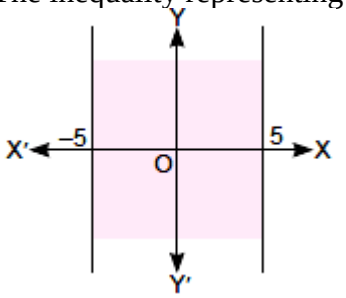
5. If $2x - 1 < 6 + x$, $4 - 3x \leq 1$, then $x \in$:

(a) [1, 7] (b) [-1, 7] (c) [1, 7) (d) (1, 7)

6. If $3x - 1 < 5 + x$, $6 - 5x \leq 1$, then $x \in$

(a) [1, 3] (b) [- 1, 3] (c) [1, 3) (d) (1, 3)

7. The inequality representing the following graph is:



(a) $|x| < 5$ (b) $|x| \leq 5$ (c) $|x| > 5$ (d) $|x| \geq 5$

8. If $\frac{x+3}{x+5}$, then $x \in$

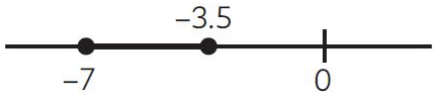
(a) (-6, 5) (b) (-6, -∞) (c) (-6, ∞) (d) (6, 12)

For Q9 and Q10, a statement of assertion (A) is followed by a statement of reason (R). Choose the correct answer out of the following choices.

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

9. Assertion (A): If $11x - 9 \leq 68$, then $x \in (-\infty, 7)$.
Reason (R): If an inequality consists of sign $\leq$ or $\geq$, then the point on the line are also included in the solution region.

10. Assertion (A): If $-5 \leq 2x + 9 \leq 2$, then $x \in [-7, -3.5]$.
Reason (R): The representation on the number line of $-5 \leq 2x + 9 \leq 2$ is



SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Find all pairs of consecutive odd positive integers both of which are smaller than 10 such that their sum is more than 11.

12. The water acidity in a pool is considered normal when the average pH reading of three daily measurements is between 8.2 and 8.5. If the first two pH readings are 8.48 and 8.35, then find the range of pH value for the third reading that will result in the acidity level being normal.

13. Solve $-15x > 45$, when (a) x is a natural number. (b) x is an integer.

14. Solve the system of inequalities: $3x - 7 < 5 + x$ and $11 - 5x \leq 1$. Also, represent the solution on the number line.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. The longest side of a triangle is twice the shortest side and the third side is 2 cm longer than the shortest side. If the perimeter of the triangle is more than 166 cm, then find the minimum length of the shortest side.

16. Solve for x: $|x + 1| + |x| > 3$

17. Solve the system of inequalities:
$5(2x – 7) –3 (2x + 3) \leq 0$, $2x + 19 \leq 6x + 47$

SECTION – D

Questions 18 carry 5 marks.

18. How many litres of water will have to be added to 1125 litres of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content?

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Aditya's mother gave him Rs. 200 to buy some packets of rice and maggie from the market. The cost of one packet of rice is Rs. 30 and that of one packet of maggie is Rs. 20. Let x denotes the number of packet of rice and y denotes the number of packets of maggie.

(a) Find the inequality that represents the given situation. (1)
(b) If he buys 4 packets of rice and spends entire amount of Rs. 200, then find the maximum number of packets of maggie that he can buy. (1)
(c) Solve the following inequality for real x: $4x + 3 < 5x + 7$ (2)

20. An intelligence quotient (IQ) is a total score derived from a set of standardised tests or subtests designed to assess human intelligence. The abbreviation "IQ" was coined by the psychologist William Stern for the German term Intelligence quotient, his term for a scoring method for intelligence tests at University of Breslau he advocated in a 1912 book.

Manjula is a Psychology student and nowadays she is learning about Intelligence Quotient (IQ). She calculates the result as follows:

Intelligence Quotient = $\frac{\text{Mental Age}}{\text{Chronological Age}} \times 100$

(a) What could be the range if mental age if a group of children with chronological age of 15 years have the IQ range as $90 \leq IQ \leq 150$?

(b) What could be the range of IQ if a group of children with age of 12 years have the mental age range as $9 \leq MA \leq 15$?

OR

(b) What could be the range of IQ if a group of children with mental age of 18 years have the mental age range as $12 \leq CA \leq 15$?