MATHS

BOOKS - S CHAND MATHS (ENGLISH)

INEQUALITIES

Example

1. Given

$$P = \{x : 5 < 2x - 1 \leq 11, x \in R\}, Q = \{x : -1 \leq 3 + 4x < 23, x \in I\}$$

where R = {real numbers}, I = {Integers}.

Represent P and Q on number lines. Write down the elements of $P \cap Q$.

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2. If $\sqrt{9x^2 + 6x + 1} < 2 - x$, then

A. $x \in \left(\dfrac{3}{2}, \dfrac{1}{4} \right)$

B. $x \in \left(-\dfrac{3}{2}, \dfrac{1}{4} \right)$

C. $x \in \left[-\dfrac{3}{2}, \dfrac{1}{4} \right]$

D. $x < \dfrac{1}{4}$

Answer: B

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Exercise 11 A

1. Yoy are given the following numbers :

$-2.6 \quad 5.1 \quad -3 \quad 0.4 \quad 1.2 \quad -3.1 \quad 4.7$

Fill in the blanks.

(i) $A = \{x : x \geq -3\} = \{...\}$

(ii) $B = \{x : x \leq 1\} = \{...\}$

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2. If the replacement set is $\{-2, -1, +1, +2, +4, +5, +9\}$, what is the solution set of each of the following mathematical sentences?

(i) $x + \dfrac{3}{2} > \dfrac{5}{2}$

(ii) $2x - 5 \geq 10$

(iii) $3y + 2 \leq \dfrac{5}{2}$

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3. List the solution set of $30 - 4(2x - 1) < 30$, given that x is a positive integer.

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4. $x \in \{2, 4, 6, 9\}$ and $y \in \{4, 6, 18, 27, 54\}$. From all ordered pairs (x, y) such that x is a factor of y and $x < y$.

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5. Find the truth set of the inequality $x > y + 2$ where

$(x + y) \in \{(1, 2), (2, 3), (5, 1), (7, 3), (5, 6), (6, 5)\}.$

6. P is the solution set of $8x - 1 > 5x + 2$ and Q is the solution set of
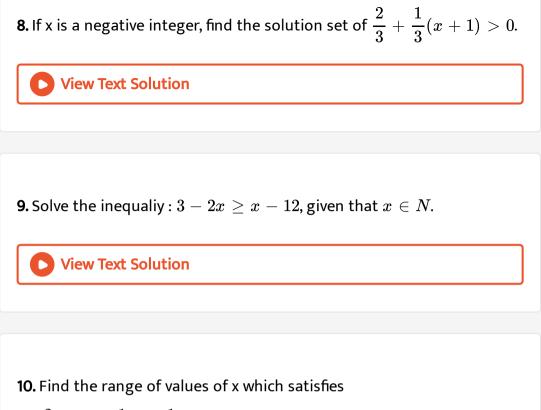
$7x - 2 \geq 3(x + 6)$, where $x \in N$. Find the set $P \cap Q$.

7. Find the solution of the inequality

$2 \leq 2p - 3 \leq 5, p \in R$

Hence, graph the solution set on the number line.

8. If x is a negative integer, find the solution set of $\dfrac{2}{3} + \dfrac{1}{3}(x + 1) > 0$.

9. Solve the inequaliy : $3 - 2x \geq x - 12$, given that $x \in N$.

10. Find the range of values of x which satisfies

$-2\dfrac{2}{3} \leq x + \dfrac{1}{3} < 9\dfrac{1}{3}, x \in R.$

Graph these values of x on the number line.

11. Find the range of values of x, which satisfy the inequality:

$\dfrac{-1}{5} \leq \dfrac{3x}{10} + 1 < \dfrac{2}{5}, x \in R$

Graph the solution set on the number line.

12. Find the range of values of x which satisfy

$$\frac{-1}{3} \le \frac{x}{2} - 1\frac{1}{3} < \frac{1}{6}, x \in R$$

Graph these values of x on the real number line.

13. Solve the following inequation, and graph the solution set, on the number line
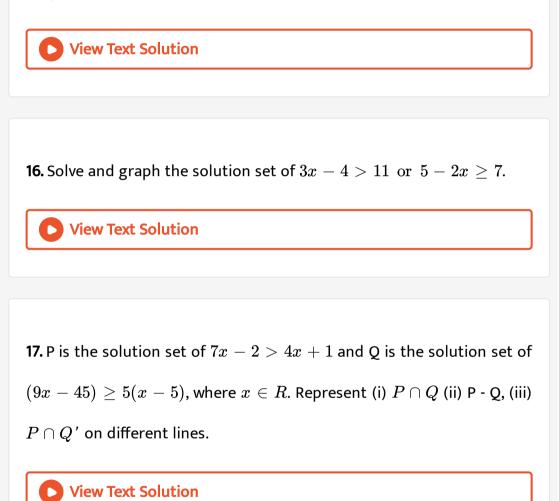
$$2x - 3 < x + 2 \le 3x + 5, x \in R.$$

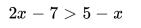**14.** Solve the inequation on: $-3 \le 3 - 2x < 9, x \in R$

15. Find the values of x which satisfies the inequation

$$-2 \leq \frac{1}{2} - \frac{2x}{3} \leq 1\frac{5}{6}, \, x \in N$$

Graph the solution on a number line.

16. Solve and graph the solution set of $3x - 4 > 11$ or $5 - 2x \geq 7$.

17. P is the solution set of $7x - 2 > 4x + 1$ and Q is the solution set of

$(9x - 45) \geq 5(x - 5)$, where $x \in R$. Represent (i) $P \cap Q$ (ii) P - Q, (iii)

$P \cap Q'$ on different lines.

18. Solve the following system of inequalities $(x \in R)$.

$2x - 7 > 5 - x$

$11 - 5x \leq 1$

19. Solve the following system of inequalities $(x \in R)$.

$2x + 5 \leq 0$

$x - 3 \leq 0$

20. Solve the following system of inequalities $(x \in R)$.

$4x + 3 \geq 2x + 17$

$3x - 5 < -2$

21. Solve the following system of inequalities $(x \in R)$.

$$5x - 7 < 3(x + 3)$$

$$1 - \frac{3x}{2} \geq x - 4$$

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22. Solve the following system of inequalities $(x \in R)$.

$$\frac{5x}{4} + \frac{3x}{8} > \frac{39}{8}$$

$$\frac{2x - 1}{12} - \frac{x - 1}{3} < \frac{3x - 1}{4}$$

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23. Solve the following system of inequalities $(x \in R)$.

$$2(2x + 3) - 10 < 6(x - 2)$$

$$\frac{2x - 3}{4} + 6 \geq 2 + \frac{4x}{3}$$

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24. Solve the following system of inequalities $(x \in R)$.

$$-11 \leq 4x - 3 \leq 13$$

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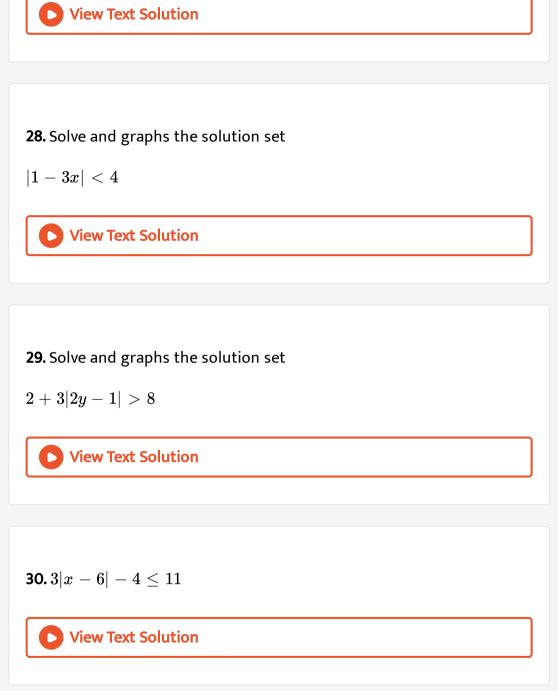**25.** Solve and graphs the solution set

$$|x - 3| < 4$$

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26. Solve and graphs the solution set

$$|x - 3| > 4$$

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27. Solve and graphs the solution set

$$|x + 3| \geq 4$$

28. Solve and graphs the solution set

$$|1 - 3x| < 4$$

29. Solve and graphs the solution set

$$2 + 3|2y - 1| > 8$$

30. $3|x - 6| - 4 \leq 11$

31. $2|3p - 5| + 1 > 7$

32. $|5 - (m - 3)| + 8 < 15$

Exercise 11 B

1. $x + y \geq 3, 7x + 6y \leq 42, x \leq 5, y \leq 4, x, y > 0$

Exercise 11 C

1. Find the range of x in each of the following inequalities:

$x^2 - 4x + 3 < 0$

2. Find the range of x in each of the following inequalities:

$$x^2 + 5x + 4 > 0$$

3. Find the range of x in each of the following inequalities:

$$x^2 + x - 6 \geq 0$$

4. Find the range of x in each of the following inequalities:

$$x^2 - 16 < 0$$

5. Find the range of x in each of the following inequalities:

$$x^2 - 6x + 9 \geq 0$$

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6. Find the range of x in each of the following inequalities:

$$-x^2 + 2x + 3 < 0$$

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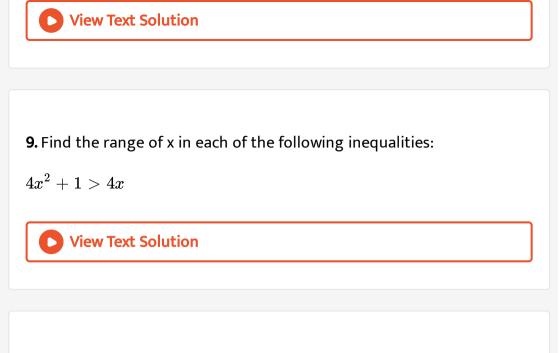**7.** Find the range of x in each of the following inequalities:

$$5x < 2 - 3x^2$$

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8. Find the range of x in each of the following inequalities:

$$-x^2 - 4x - 5 < 0$$

9. Find the range of x in each of the following inequalities:

$$4x^2 + 1 > 4x$$

10. Find the range of x in each of the following inequalities:

$$-x^2 + x > 0$$

11. Find the range of x in each of the following inequalities:

$$6 + x < 2x^2$$

12. Find the range of x in each of the following inequalities:

$(x - 4)(x + 6) > 0$

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13. Find the range of x in each of the following inequalities:

$3 - 2x^2 > 5x$

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14. Find all real values of x which satisfy

$x^2 - 3x + 2 > 0$ and $x^2 - 3x - 4 \leq 0$.

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15. The set of values of x which the inequalities

$x^2 - 3x - 10 < 0, 10x - x^2 - 16 > 0$ hold simultaneously is

A. (-2, 5)

B. (2, 8)

C. (-2, 8)

D. (2, 5)

Answer: D

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16. Solve the following inequalities:

$$\frac{x + 3}{x - 1} > x$$

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17. Solve the following inequalities:

$$x + 4 < -\frac{2}{x + 1}.$$

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18. Solve the following inequalities:

$$\frac{x^2 - 2x + 3}{x^2 - 4x + 3} > -3$$

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19. Solve the following inequalities:

$$\frac{x^2 + 6x - 11}{x + 3} < -1$$

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20. Solve the following inequalities:

$$\frac{x^2 - 3x + 24}{x^2 - 3x + 3} < 4$$

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Chapter Test

1. Solve: $24x < 100$, when

x is a natural number

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2. Solve: $24x < 100$, when

x is an integer

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3. Solve the inequality $\frac{1}{2}\left(\frac{3}{5}x + 4\right) \geq \frac{1}{3}(x - 6)$

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4. Solve: $-12 \leq 4 - \frac{3x}{-5} < 2$

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