Exercise 4

1. Solve the inequation, 3x − 11 < 3 where x ∈ {1, 2, 3, ······, 10}. Also, represent its solution on a
number line.
Solution:
Given inequation, 3x − 11 < 3
3x < 3 + 11
3x < 14
⟹ x < 14/3
But, x ∈ {1, 2, 3, ······, 10}
Hence, the solution set is {1, 2, 3, 4}.
Representing the solution on a number line:
2. Solve 2(x − 3) < 1, x ∈ {1, 2, 3, ···. 10}
Solution:
Given inequation, 2(x − 3) < 1
2x − 6 < 1
2x < 7
⟹ x < 7/2
But, x ∈ {1, 2, 3, ···. 10}
Hence, the solution set is {1, 2, 3}
3. Solve 5 − 4x > 2 − 3x, x ∈ W. Also represent its solution on the number line.
Solution:
Given inequation, 5 − 4x > 2 − 3x
- 4x + 3x > 2 − 5
-x > -3
On multiplying both sides by -1, the inequality reverses
⟹ x < 3
Since, x ∈ W
The solution set is {0, 1, 2}
Representing the solution on a number line:
4. List the solution set of 30 − 4 (2x − 1) < 30, given that x is a positive integer.
Solution:
Given inequation, 30 − 4 (2x − 1) < 30
30 − 8x + 4 < 30

34 − 8x < 30
-8x < 30 − 34
-8x < -4 [On multiplying both sides by -1, the inequality reverses]
8x > 4

x > 4/8
⇒ x > 1/2
As x is a positive integer
The solution set is {1, 2, 3, ⋯ }

5. Solve: 2 (x ‐ 2) < 3x ‐ 2, x ∈ {‐ 3, ‐ 2, ‐ 1, 0, 1, 2, 3}.
Solution:
Given inequation, 2 (x ‐ 2) < 3x ‐ 2
2x - 4 < 3x ‐ 2
2x ‐ 3x < -2 + 4
-x < 2
⇒ x > -2
But, x ∈ {‐ 3, ‐ 2, ‐ 1, 0, 1, 2, 3}
Hence, the solution set is {‐ 1, 0, 1, 2, 3}.

6. If x is a negative integer, find the solution set of 2/3 + 1/3 (x + 1) > 0.
Solution:
Given inequation, 2/3 + 1/3 (x + 1) > 0.
2/3 + x/3 + 1/3 > 0
x/3 + 1 > 0
x/3 > -1
⇒ x > -3
As x is a negative integer
The solution set is {-1, -2}.

7. Solve: (2x - 3) /4 ≥ ½ , x ∈ {0, 1, 2, ⋯, 8}
Solution:
Given inequation, (2x - 3) /4 ≥ ½
2x ‐ 3 ≥ 4 x ½
2x ‐ 3 ≥ 2
2x ≥ 2 + 3
2x ≥ 5
⇒ x ≥ 5/2
But, x ∈ {0, 1, 2, ⋯, 8}
Hence, the solution set is {3, 4, 5, 6, 7, 8}.

8. Solve x ‐ 3 (2 + x) > 2 (3x ‐ 1), x ∈ { ‐ 3, ‐ 2, ‐ 1, 0, 1, 2, 3}. Also represent its solution
on the
number line.
Solution:

Given inequation, x ‐ 3 (2 + x) > 2 (3x ‐ 1)
x ‐ 6 ‐ 3x > 6x ‐ 2
-2x ‐ 6 > 6x ‐ 2
-6x ‐ 2x > -2 + 6
-8x > 4

x < -4/8

$\Rightarrow$ x < -1/2

But, x $\in$ { - 3, - 2, - 1, 0, 1, 2, 3}

Hence, the solution set is {-3, -2, -1}

9. Given x $\in$ {1, 2, 3, 4, 5, 6, 7, 9} solve x - 3 < 2x - 1.

Solution:

Given inequation, x - 3 < 2x - 1

x - 2x < - 1 + 3

-x < 2

$\Rightarrow$ x > -2

But, x $\in$ {1, 2, 3, 4, 5, 6, 7, 9}

Hence, the solution set is {1, 2, 3, 4, 5, 6, 7, 9}.

10. Given A = {x: x $\in$ I, - 4 $\leq$ x $\leq$ 4}, solve 2x - 3 < 3 where x has the domain A.
Graph the solution
set on the number line.

Solution:

Given equation, 2x - 3 < 3

2x < 6

$\Rightarrow$ x < 3

But x has a the domain A = {x: x $\in$ I, - 4 $\leq$ x $\leq$ 4}

A = {-4, -3, -2, -1, 0, 1, 2, 3, 4}

Hence, the solution set is {-4, -3, -2, -1, 0, 1, 2}.

Representing the solution on a number line:

11. List the solution set of the inequation
½ + 8x > 5x - 3/2, x $\in$ Z

Solution:

Given inequation, ½ + 8x > 5x - 3/2

8x - 5x > -3/2 - ½

3x > -4/2

$\Rightarrow$ x > -2/3

As x $\in$ Z

The solution set is {0, 1, 2, 3, 4, 5, $\cdots$}

12. List the solution set of (11 - 2x)/5 $\geq$ (9 - 3x)/8 + 3/4, x $\in$ N

Solution:

Given inequation, (11 - 2x)/5 $\geq$ (9 - 3x)/8 + ¾

(11 - 2x)/5 $\geq$ (9 - 3x + 6)/8

8 (11 - 2x) $\geq$ 5 (15 - 3x)

88 - 16x $\geq$ 75 - 15x

15x - 16x $\geq$ 75 - 88

-x $\geq$ -13

$\Rightarrow$ x $\leq$ 13

As x ∈ N

Hence, the solution set is {1, 2, 3, 4, ⋯, 13}.

13. Find the values of x, which satisfy the inequation : , x ∈ N. Graph the solution set on the number line.

Solution:

Given inequation,

-2 ≤ (3 - 4x)/ 6 ≤ 11/6

-12 ≤ 3 - 4x ≤ 11

-12 - 3 ≤ -4x ≤ 11 - 3

-15 ≤ -4x ≤ 8

-15/4 ≤ -x ≤ 8/4

⟹ 15/4 ≥ x ≥ -2

As x ∈ N,

The solution set is {1, 2, 3}.

Representing the solution on a number line:

14. If x ∈ W, find the solution set of 3/5 x ‑ (2x - 1)/3 > 1. Also graph the solution set on the number

line, if possible.

Solution:

Given inequation, 3/5 x ‑ (2x - 1)/3 > 1

9/15 x ‑ 5(2x - 1)/15 > 1 [Taking L.C.M]

9x ‑ 5(2x - 1) > 15 [Multiplying by 15 on both sides]

9x ‑ 10x + 5 > 15

-x > 15 ‑ 5

-x > 10

⟹ x < -10

But, x ∈ W

Hence, the solution set is a null set.

Thus, it can't be represented on number line.

15. Solve:

(i) x/2 + 5 ≤ x/3 + 6 where x is a positive odd integer.

(ii) (2x + 3)/3 ≥ (3x - 1)/4 where x is positive even integer.

Solution:

(i) Given inequation, x/2 + 5 ≤ x/3 + 6

(x + 10)/2 ≤ (x + 18)/3 [Taking L.C.M on both sides]

3 (x + 10) ≤ 2 (x + 18) [On cross-multiplying]

3x + 30 ≤ 2x + 36

3x ‑ 2x ≤ 36 ‑ 30

⟹ x ≤ 6

As x is a positive odd integer.

Hence, the solution set is {1, 3, 5}.

(ii) Given inequation, $(2x + 3)/3 \geq (3x - 1)/4$

$4(2x + 3) \geq 3(3x - 1)$ [On cross-multiplying]

$8x + 12 \geq 9x - 3$

$-9x + 8x \geq -12 - 3$

$-x \geq -15$

$\Rightarrow x \leq 15$

As x is positive even integer.

Hence, the solution set is {2, 4, 6, 8, 10, 12, 14}.

16. Given that x ∈ I, solve the inequation and graph the solution on the number line:

$3 \geq (x - 4)/2 + x/3 \geq 2$

Solution:

Given inequation, $3 \geq (x - 4)/2 + x/3 \geq 2$

Now, let's take

$3 \geq (x - 4)/2 + x/3$, we have

$3 \geq (3x - 12 + 2x)/6$ [Taking L.C.M]

$18 \geq 5x - 12$

$30 \geq 5x$

$\Rightarrow x \leq 6$ …. (i)

Next,

$(x - 4)/2 + x/3 \geq 2$

$(3x - 12 + 2x)/6 \geq 2$

$5x - 12 \geq 12$

$5x \geq 24$

$x \geq 24/5 \Rightarrow x \geq 4.8$ … (ii)

Hence, from (i) and (ii) we have

Solution of x = {5, 6}

Representing the solution on a number line:

17. Given x ∈ {1, 2, 3, 4, 5, 6, 7, 9}, find the values of x for which -3 < 2x - 1 < x + 4.

Solution:

Given inequation, $-3 < 2x - 1 < x + 4$

So, we have

$-3 < 2x - 1$ and $2x - 1 < x + 4$

$-2x < 3 - 1$ and $2x - x < 4 + 1$

$-2x < 2$ and $x < 5$

$x > -1$ and $x < 5$

As x ∈ {1, 2, 3, 4, 5, 6, 7, 9}

The solution set is {1, 2, 3, 4}.

18. Solve: $1 \geq 15 - 7x > 2x - 27$, x ∈ N

Solution:

Given inequation, $1 \geq 15 - 7x > 2x - 27$,
So, we have
$1 \geq 15 - 7x$ and $15 - 7x > 2x - 27$
$7x \geq 15 - 1$ and $-2x - 7x > -27 - 15$
$7x \geq 14$ and $-9x > -42$
$x \geq 2$ and $-x > -42/9$
$x \geq 2$ and $x < 14/3$
$\Rightarrow 2 \leq x < 14/3$
But as $x \in N$
The solution set is {2, 3, 4}.

19. If x $\in$ Z, solve $2 + 4x < 2x - 5 \leq 3x$. Also represent its solution on the number line.
Solution
Given inequation, $2 + 4x < 2x - 5 \leq 3x$
So, we have
$2 + 4x < 2x - 5$ and $2x - 5 \leq 3x$
$4x - 2x < -5 - 2$ and $2x - 3x \leq 5$
$2x < -7$ and $-x \leq 5$
$x < -7/2$ and $x \geq -5$
$\Rightarrow -5 \leq x < -7/2$
As $x \in Z$
The solution set is {-5, -4}.
Representing the solution on a number line:

20. Solve the inequation $12 + \leq 5 + 3x, \ x \in$ R. Represent the solution on a number line.
Solution:
Given inequation, $12 + \leq 5 + 3x$
$12 + 11/6 \ x \leq 5 + 3x$
$72 + 11x \leq 30 + 18x$ [Multiplying by 6 on both sides]
$11x - 18x \leq 30 - 72$
$-7x \leq -42$
$-x \leq -6$
$x \geq 6$
As $x \in R$
The solution set is {x : x $\in$ R, $x \geq 6$}
Representing the solution on a number line:
21. Solve: (4x - 10)/3 $\leq$ (5x - 7)/2, x $\in$ R and represent the solution set on the number line.
Solution:
Given inequation, $(4x - 10)/3 \leq (5x - 7)/2$
$2 (4x - 10) \leq 3 (5x - 7)$ [On cross-multiplying]
$8x - 20 \leq 15x - 21$

8x – 15x ≤ -21 + 20

-7x ≤ -1

-x ≤ -1/7

x ≥ 1/7

As x ∈ R

Hence, the solution set is {x: x ∈ R, x ≥ 1/7}

Representing the solution on a number line:

22. Solve 3x/5 – (2x - 1)/3 > 1, x ∈ R and represent the solution set on the number line.

Solution:

Given inequation, $3x/5 – (2x - 1)/3 > 1$

$(9x – 10x + 5)/15 > 1$ [Taking L.C.M]

-x + 5 > 15

-x > 15 – 5

-x > 10

x < -10

As x ∈ R

Hence, the solution set is {x: x ∈ R, x < -10}

Representing the solution on a number line:

23. Solve the inequation – 3 ≤ 3 – 2x < 9, x ∈ R. Represent your solution on a number line.

Solution:

Given inequation, – 3 ≤ 3 – 2x < 9

– 3 – 3 ≤ – 2x < 9 – 3

-6 ≤ -2x < 6

-3 ≤ -x < 3

-3 < x ≤ 3

As x ∈ R

The solution set is {x: x ∈ R, -3 < x ≤ 3}

Representing the solution on a number line:

24. Solve 2 ≤ 2x – 3 ≤ 5, x ∈ R and mark it on a number line.

Solution:

Given inequation, 2 ≤ 2x – 3 ≤ 5

2 + 3 ≤ 2x ≤ 5 + 3

5 ≤ 2x ≤ 8

5/2 ≤ x ≤ 4

Hence, the solution set is {x: x ∈ R, 5/2 ≤ x ≤ 4}

Representing the solution on a number line:

25. Given that x ∈ R, solve the following inequation and graph the solution on the number line: -1

≤ 3 + 4x < 23.

Solution:
Given inequation, $-1 \leq 3 + 4x < 23$
$-1 - 3 \leq 4x < 23 - 3$
$-4 \leq 4x < 20$
$-4/4 \leq x < 20/4$
$-1 \leq x < 5$
Hence, the solution set is $\{-1 \leq x < 5; x \in R\}$
Representing the solution on a number line:

26. Solve the following inequation and graph the solution on the number line.

, x ∈ R
Solution:
Given inequation,
$-8/3 \leq (3x + 1)/3 < 10/3$
$-8 \leq 3x + 1 < 10$ [Multiplying by 3]
$-8 - 1 \leq 3x < 10 - 1$
$-9 \leq 3x < 9$
$-3 \leq x < 3$ [Dividing by 5]
Thus, the solution set is $\{x: x \in R, -3 \leq x < 3\}$
Representing the solution on a number line:

27. Solve the following inequation and represent the solution set on the number line:
Solution:
Given in equation,
$-3 < -(3 + 4x)/6 \leq 5/6$ [Taking L.C.M]
$-18 < -3 - 4x \leq 5$ [Multiplying by 6]
$-18 + 3 < -4x \leq 5 + 3$
$-15 < -4x \leq 8$
$-15/4 < -x \leq 8/4$
$-2 \leq x < 15/4$
Hence, the solution set is $\{x : x \in R, -2 \leq x < 15/4\}$
Representing the solution on a number line:

28. Solve . Also graph the solution set on the number line
Solution:
Given inequation,
$[2x + 1 + 4(3 - x)]/2 \geq 7$ [Taking L.C.M]
$2x + 1 + 12 - 4x \geq 14$
$-2x + 13 \geq 14$
$-2x \geq 14 - 13$

$-2x \geq 1$

-x ≥ ½

x ≤ -½

Hence, the solution set is {x : x ∈ R, x ≤ -½}

Representing the solution on a number line:

29. Solving the following inequation, write the solution set and represent it on the number line -

3(x - 7) ≥ 15 - 7x >, x ∈ R

Solution:

Given inequation, -3(x - 7) ≥ 15 - 7x >

⁻3x + 21 ≥ 15 - 7x > (x + 1)/3

So,

-3x + 21 ≥ 15 - 7x

7x - 3x ≥ 15 - 21

4x ≥ -6

x ≥ -6/4

x ≥ -3/2

And,

15 - 7x > (x + 1)/3

3(15 - 7x) > x + 1

45 - 21x > x + 1

-21x - x > 1 - 45

-22x > -44

-x > -44/22

x < 2

Hence, the solution set is {x : x ∈ R , -3/2 ≤ x < 2}

Representing the solution on a number line:

30. Solve the inequation :

. Graph the solution set on the number line.

Solution:

Given inequation,

-5/2 + 2x ≤ 4x/3 ≤ 4/3 + 2x

So, we have

-5/2 + 2x ≤ 4x/3 and 4x/3 ≤ 4/3 + 2x

2x - 4x/3 ≤ 5/2 and 4x/3 - 2x ≤ 4/3

(6x - 4x)/3 ≤ 5/2 and (4x - 6x)/3 ≤ 4/3 [Taking L.C.M]

2x ≤ 15/2 and -2x ≤ 4

x ≤ 15/4 and -x ≤ 2 [Dividing by 2]

x ≤ 15/4 and x ≥ -2

-2 ≤ x ≤ 15/4

For x ∈ W

Thus, the solution set is {0, 1, 2, 3}

Representing the solution on a number line:

31. Solve the inequation 2x − 5 ≤ 5x + 4 < 11, where x ∈ I. Also represent the solution set on the number line.

Solution:

Given inequation, 2x − 5 ≤ 5x + 4 < 11

So, we have

2x − 5 ≤ 5x + 4 and 5x + 4 < 11

2x − 5x ≤ 4 + 5 and 5x < 11 − 4

-3x ≤ 9 and 5x < 7

-x ≤ 9/3 and x < 7/5

x ≥ -3 and x < 7/5

-3 ≤ x < 7/5

As x ∈ I

Thus, the solutions set is {-3, -2, -1, 0, 1}

Representing the solution on a number line:

32. If x ∈ I, A is the solution set of 2 (x − 1) < 3x − 1 and B is the solution set of 4x − 3 ≤ 8 + x, find A ∩ B.

Solution:

Given inequations,

2 (x − 1) < 3x − 1 and 4x − 3 ≤ 8 + x for x ∈ I

Solving for both, we have

2x − 3x < 2 − 1 and 4x − x ≤ 8 + 3

-x < 1 and 3x ≤ 11

x > -1 and x ≤ 11/3

Hence,

Solution set A = {0, 1, 2, 3, ⋯}

Solution set B = {3, 2, 1, 0, -1, ⋯ }

Thus, A ∩ B = {0, 1, 2, 3}

33. If P is the solution set of -3x + 4 < 2x − 3, x ∈ N and Q is the solution set of 4x − 5 < 12, x ∈ W, find

(i) P ∩ Q

(ii) Q − P.

Solution:

Given inequations,

-3x + 4 < 2x − 3 where x ∈ N and 4x − 5 < 12 where x ∈ W

So, solving

-3x + 4 < 2x − 3 where x ∈ N

-3x - 2x < -3 - 4

-5x < -7

x > 7/5

Hence, the solution set P is {2, 3, 4, 5, ⋯}

And, solving

4x - 5 < 12 where x ∈ W

4x < 12 + 5

4x < 17

x < 17/4

Hence, the solution set Q is {0, 1, 2, 3, 4}

Therefore,

(i) P ∩ Q = {2, 3, 4}

(ii) Q - P = {0, 1}

34. A = {x : 11x - 5 > 7x + 3, x ∈ R} and B = {x : 18x - 9 ≥ 15 + 12x, x ∈ R}

Find the range of set A ∩ B and represent it on a number line

Solution:

Given, A = {x : 11x - 5 > 7x + 3, x ∈ R} and B = {x : 18x - 9 ≥ 15 + 12x, x ∈ R}

Solving for A,

11x - 5 > 7x + 3

11x - 7x > 3 + 5

4x > 8

x > 2

Hence, A = {x : x > 2, x ∈ R}

Next, solving for B

18x - 9 ≥ 15 + 12x

18x - 12x ≥ 15 + 9

6x ≥ 24

x ≥ 4

Hence, B = {x : x ≥ 4, x ∈ R}

Thus, A ∩ B = x ≥ 4

Representing the solution on a number line:

35. Given: P {x : 5 < 2x - 1 ≤ 11, x ∈ R}

Q {x : - 1 ≤ 3 + 4x < 23, x ∈ I} where

R = (real numbers), I = (integers)

Represent P and Q on number line. Write down the elements of P ∩ Q.

Solution:

Given, P {x : 5 < 2x - 1 ≤ 11, x ∈ R} and Q {x : - 1 ≤ 3 + 4x < 23, x ∈ I}

Solving for P,

5 < 2x - 1 ≤ 11

5 + 1 < 2x ≤ 11 + 1

6 < 2x ≤ 12

$3 < x \leq 6$

Hence, $P = P\{x : 3 < x \leq 6, x \in R\}$

Representing the solution on a number line:

Next, solving for Q

$-1 \leq 3 + 4x < 23$

$-1 - 3 \leq 4x < 23 - 3$

$-4 \leq 4x < 20$

$-1 \leq x < 5$

Hence, solution $Q = \{-1, 0, 1, 2, 3, 4\}$

Representing the solution on a number line:

Therefore, $P \cap Q = \{4\}$

36. If x ∈ I, find the smallest value of x which satisfies the inequation

Solution:

Given inequation,

$(4x + 5)/2 > (5x + 6)/3$ [Taking L.C.M]

$3 (4x + 5) > 2 (5x + 6)$ [On cross-multiplication]

$12x + 15 > 10x + 12$

$12x - 10x > 12 - 15$

$2x > -3$

$x > -3/2$

Hence, for $x \in I$ the smallest value of x is -1.

37. Given 20 - 5 x < 5 (x + 8), find the smallest value of x, when

(i) x ∈ I

(ii) x ∈ W

(iii) x ∈ N.

Solution:

Given inequation, $20 - 5 x < 5 (x + 8)$

$20 - 5x < 5x + 40$

$-5x - 5x < 40 - 20$

$-10x < 20$

$-x < 20/10$

$x > -2$

Thus,

(i) For $x \in I$, the smallest value = -1

(ii) For $x \in W$, the smallest value = 0

(iii) For $x \in N$, the smallest value = 1

38. Solve the following inequation and represent the solution set on the number line:

Solution:

Given inequation,

So, we have

$4x - 19 < 3x/5 - 2$ and $3x/5 - 2 \leq -2/5 + x$

4x − 3x/5 < 19 − 2 and 3x/5 − x ≤ 2 − 2/5

(20x − 3x)/5 < 17 and (3x − 5x)/5 ≤ (10 − 2)/5

17x < 35 and -2x ≤ 8 [Multiplying by 5]

x < 5 and -x ≤ 4

x < 5 and x ≥ 4

-4 ≤ x < 5, x ∈ R

Hence, the solution set is {x : -4 ≤ x < 5, x ∈ R}

Representing the solution on a number line:

39. Solve the given inequation and graph the solution on the number line:

2y − 3 < y + 1 ≤ 4y + 7; y ∈ R.

Solution:

Given inequation, 2y − 3 < y + 1 ≤ 4y + 7

So, we have

2y − 3 < y + 1 and y + 1 ≤ 4y + 7

2y − y < 1 + 3 and y − 4y ≤ 7 − 1

y < 4 and -3y ≤ 6

y < 4 and -y ≤ 2 ⟹ y ≥ -2

Thus, -2 ≤ y < 4

The solution set is {y : -2 ≤ y < 4, y ∈ R}

Representing the solution on a number line:

40. Solve the inequation and represent the solution set on the number line.

Solution:

Given inequation,

So, we have

-3 + x ≤ 8x/3 + 2 and 8x/3 + 2 ≤ 14/3 + 2x

x − 8x/3 ≤ 2 + 3 and 8x/3 − 2x ≤ 14/3 − 2

(3x − 8x)/3 ≤ 5 and (8x − 6x)/3 ≤ (14 − 6)/3 [Taking L.C.M]

-5x/3 ≤ 5 and 2x ≤ 8

-5x ≤ 15 and x ≤ 8/2

-x ≤ 3 and x ≤ 4

x ≥ -3 and x ≤ 4

⟹ -3 ≤ x ≤ 4

Thus, the solution set is {-3, -2, -1, 0, 1, 2, 3, 4}

Representing the solution on a number line:

41. Find the greatest integer which is such that if 7 is added to its double, the resulting number

becomes greater than three times the integer.

Solution:

Let's consider the greatest integer to be x

Then according to the given condition, we have

2x + 7 > 3x

2x − 3x > -7

-x > -7

x < 7 , x ∈ R

Hence, the greatest integer value is 6.

42. One-third of a bamboo pole is buried in mud, one-sixth of it is in water and the part above the

water is greater than or equal to 3 metres. Find the length of the shortest pole.

Solution:

Let's assume the length of the shortest pole = x metre

Now,

Length of the pole which is buried in mud = x/3

Length of the pole which is in the water = x/6

Then according to the given condition, we have

x − [x/3 + x/6] ≥ 3

x − [(2x + x)/6] ≥ 3

x − 3x/6 ≥ 3

x − x/2 ≥ 3

x/2 ≥ 3

x ≥ 6 [Multiplying by 6]

Therefore, the length of the shortest pole is 6 metres.

Chapter Test

1. Solve the inequation: 5x − 2 ≤ 3 (3 - x) where x ∈ {-2, -1, 0, 1, 2, 3, 4}. Also represent its solution

on the number line.

Solution:

Given inequation, 5x − 2 ≤ 3 (3 - x)

5x − 2 ≤ 9 - 3x

5x + 3x ≤ 9 + 2

8x ≤ 11

x ≤ 11/8

As x ∈ {-2, -1, 0, 1, 2, 3, 4}

The solution set is {-2, -1, 0, 1}

Representing the solution on a number line:

2. Solve the inequation: 6x − 5 < 3x + 4, x ∈ I

Solution:

Given inequation, 6x − 5 < 3x + 4

6x − 3x < 4 + 5

3x < 9

x < 9/3
x < 3
As x ∈ I
The solution set is {2, 1, 0, -1, -2, ···}

3. Find the solution set of the inequation x + 5 ≤ 2x + 3; x ∈ R
Graph the solution set on the number line.
Solution:
Given inequation, x + 5 ≤ 2x + 3
x - 2x ≤ 3 - 5
-x ≤ -2
x ≥ 2
As x ∈ R
Thus, the solution set is {2, 3, 4, 5, ···}
Representing the solution on a number line:

4. If x ∈ R (real numbers) and -1 < 3 - 2x ≤ 7, find solution set and present it on a number line.
Solution:
Given inequation, -1 < 3 - 2x ≤ 7

-1 - 3 < -2x ≤ 7 - 3
-4 < -2x ≤ 4
-4/2 < -x ≤ 4/2
-2 < -x ≤ 2
Thus, -2 ≤ x < 2
The solution set is {x : x ∈ R, -2 ≤ x < 2}
Representing the solution on a number line:

5. Solve the inequation:
Solution:
Given inequation,
(5x + 1)/7 - 4 (5x + 14)/35 ≤ 8/5 + (3x - 1)/7
[5(5x + 1) - 4 (5x + 14)]/ 35 ≤ [56 + 5 (3x - 1)]/ 35 [Taking L.C.M]
(25x + 5 - 20x - 56) ≤ 56 + 15x - 5
5x - 51 ≤ 51 + 15x
5x - 15x ≤ 51 + 51
-10x ≤ 102
-x ≤ 102/10
x ≥ - 51/5
Hence, the solution set is {x : x ∈ R , x ≥ - 51/5}