

$$1 \quad 6 + 3x \leq 5$$

$$3x \leq 5 - 6$$

$$3x \leq -1$$

Divide by (-)
on both sides

$$x \leq -\frac{1}{3}$$

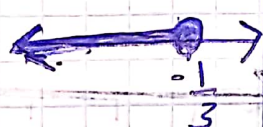
SET BUILDER

✓ It is set of all "x"
in such "x" is any
number less than $-\frac{1}{3}$

$$\{x \mid x \leq -\frac{1}{3}\} \rightarrow \text{brackets}$$

INTERVAL

$$(-\infty, -\frac{1}{3}]$$



$$2 \quad 4 - 2x \leq 0$$

$$4 \leq 2x$$

$$\frac{2x}{2} \geq \frac{4}{2}$$

Divide by 2
on both
sides

$$x \geq 2$$

SET BUILDER

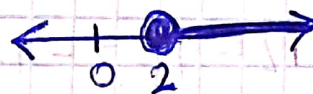
The set of all "x"
such that "x" is any
number between

2 and greater than
2

$$\{x \mid x \geq 2\} \rightarrow \text{Brackets}$$

INTERVAL

$$[2, \infty)$$



$$3. \quad \frac{2}{3}x - 5 > 1$$

$$\frac{2}{3}x > 1 + 5$$

$$3 \times \frac{2}{3}x > 6 + 3$$

$$\frac{2x}{2} > \frac{18}{2}$$

$$x > 9$$

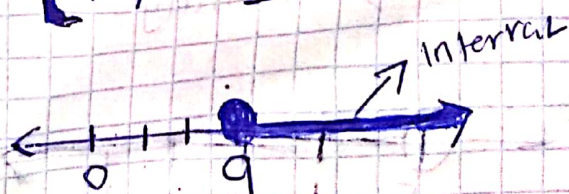
SET BUILDER

The set of all "x" such
that "x" is any number
greater than 9

$$\{x \mid x > 9\}$$

INTERVAL

$$[9, \infty)$$



4

$$12 > 7 - 9x$$

✓ Group the like terms together

$$12 - 7 > -9x \quad [\quad]$$

$$5 > -9x$$

✓ Divide by (-1) on both sides and change the inequality sign

$$\frac{9x}{9} > \frac{-5}{9}$$

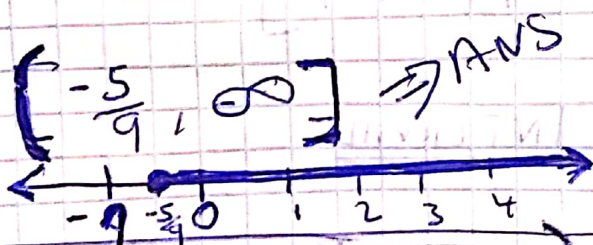
Divide by "9" on both sides

$$x > -\frac{5}{9}$$

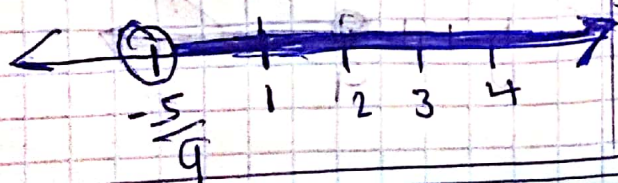
SET BUILDER

$$\{x \mid x > -\frac{5}{9}\}$$

INTERVAL



$\infty \rightarrow$ infinity



5

$$3x - 1 \leq 2x + 2$$

$$3x - 2x \leq 2 + 1$$

$$x \leq 3$$

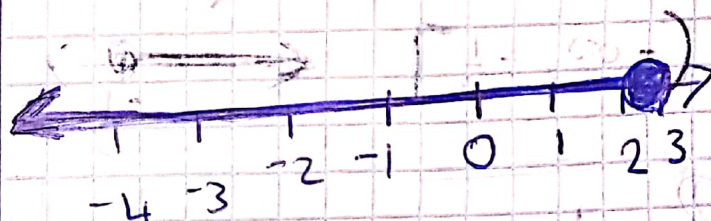
SET BUILDER

The set of all "x" in such that P is any number that is less than 3, inclusive

$$\{x \mid x \leq 3\} \rightarrow \text{brackets}$$

INTERVAL

$$[-\infty, 3] \quad (-\infty, 3]$$



$$6 \quad 5 \leq \frac{1}{2}x - 1 \leq 8$$

Solution

$$5 \leq \frac{1}{2}x - 1$$

$$5 + 1 \leq \frac{1}{2}x$$

$$2 \times 6 \leq \frac{1}{2}x \times 2 \text{ Multiply by "2"}$$

$$12 \leq x \Rightarrow \underline{\underline{x \geq 12}}$$

$\Rightarrow$ and

$$\frac{1}{2}x - 1 \leq 8$$

$$\frac{1}{2}x \leq 8 + 1$$

$$2 \times \frac{1}{2}x \leq 9 \times 2 \text{ multiply by "2"}$$

$$x \leq 18$$

$$12 \leq x \leq 18 \quad *$$

SET BUILDER

✓ The set of all "x" such that x is any number between 12 and 18, inclusive.

$$\{x \mid 12 \leq x \leq 18\}$$

INTERVAL

$$[12, 18] \quad \checkmark$$



$$7 \quad -2 < 2x - 5 < 3$$

$$-2 < 2x - 5$$

$$-2 + 5 < 2x$$

$$3 < 2x \text{ Divide by "2"}$$

$$\frac{3}{2} < x \text{ or}$$

$$2x - 5 < 3$$

$$2x < 3 + 5$$

$$\frac{2x}{2} < \frac{8}{2} \text{ Divide by 2}$$

$$x < 4$$

$$\frac{3}{2} < x < 4 \quad *$$

SET BUILDER

The set of all numbers such that "x" is any number between $\frac{3}{2}$ and 4, not included

And 4, not included

$$\{x \mid \frac{3}{2} < x < 4\}$$

INTERVAL

$$(\frac{3}{2}, 4) \Rightarrow (\frac{3}{4}, 4) \quad \checkmark$$



$\circ \Rightarrow$ means that number is not included

$$8 \quad x-4 \leq 2 \text{ or } x+4 \geq 12$$

$$\checkmark x-4 \leq 2 \Rightarrow x \leq 6$$

$$\checkmark x+4 \geq 12 \Rightarrow x \geq 12-4$$

$$x \leq 6 \text{ or } x \geq 8$$

$$x \leq 6 \text{ or } x \geq 8 \quad \checkmark$$

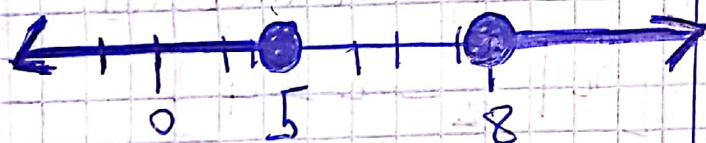
SET BUILDER

$$\{x \mid x \leq 6 \text{ or } x \geq 8\}$$

INTERVAL

$$[-\infty, 6] \cup [8, \infty)$$

Union



• $\rightarrow$ means that
particular number
is included

$$9 \quad -7 < 8-3x \leq 8$$

$$-7 < 8-3x$$

$$3x < 8+7 \quad \text{Divide by } 3$$

$$\frac{3x}{3} < \frac{15}{3}$$

$$x < 5 \quad \text{and}$$

$$8-3x \leq 8$$

$$8-8 \leq 3x$$

$$0 \leq 3x \quad \text{Divide by } 3$$

$$0 \leq x$$

$$x \geq 0$$

$$0 \leq x \leq 5 \quad *$$

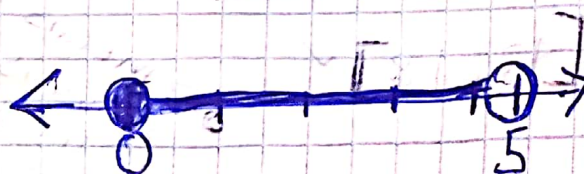
$$0 \leq x < 5$$

SET BUILDER

$$\{x \mid 0 \leq x < 5\}$$

INTERVAL

$$[0, 5) \Rightarrow [0, 5)$$



○ means it is not
included in the
interval

10 $2x + 3 < -12$ or $-x \leq 6$

✓ $2x + 3 < -12$

$2x < -12 - 3$

$2x < -15$ Divide by 2

$x < -\frac{15}{2} = -7.5$

✓ $-x \leq 6 \Rightarrow$ Divide by (-1)
And Sign
Changes

$x \geq -6$

$-6 \leq x < -7.5$

$-6 \leq x < -7.5$

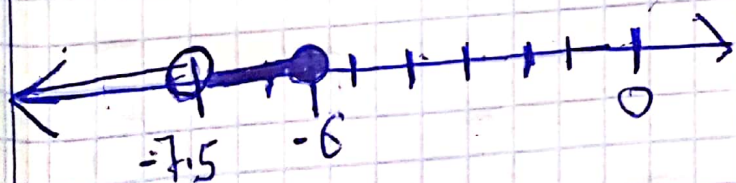
SET BUILDER

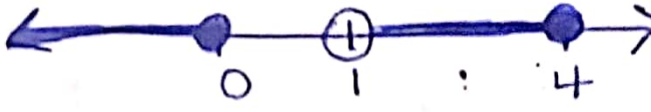
$\{x | -6 \leq x < -7.5\}$

INTERVAL

$[-7.5, -6]$

$(-7.5, -6]$



INEQUALITY	SET-BUILDER	INTERVAL	GRAPH
$x > -1$	$\{x x > -1\}$	$[-1, \infty)$	
$-\infty < x \leq 0$ or $1 < x \leq 4$	$\{x -\infty < x \leq 0 \text{ or } 1 < x \leq 4\}$	$(-\infty, 0] (1, 4]$	
$x \neq 2$	$\{x x \neq 2\}$	$(-\infty, 2) (2, \infty)$	

• or $]$ $\Rightarrow$ Means that number is included in the interval

$($ or $($ $\Rightarrow$ Means that number is not included in the interval

$[\infty]$ $\rightarrow$ it is read as ∞ is such that -----

$[a - b]$

