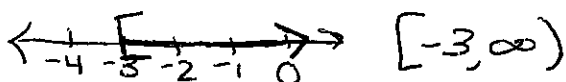


Directions: Solve each of the following inequalities for x. Write your final answer **graphically** and in **interval notation**.

1.  $3 - 2x \leq 9$

$-2x \leq 6$

$x \geq -3$

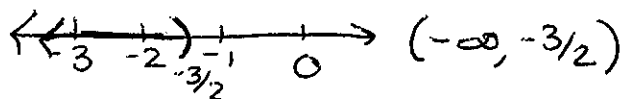


2.  $5x + 6 > 7x + 9$

$$\begin{array}{r} -6 \quad -6 \\ \hline 5x > 7x + 3 \\ -7x \quad -7x \\ \hline \end{array}$$

$-2x > 3$

$x < -3/2$

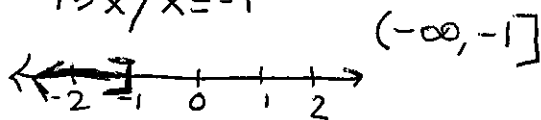


3.  $4 - 3x \geq 5x + 12$

$$\begin{array}{r} +3x \quad +3x \\ \hline 4 \geq 8x + 12 \\ -12 \quad -12 \\ \hline \end{array}$$

$-8 \geq 8x$

$-1 \geq x / x \leq -1$

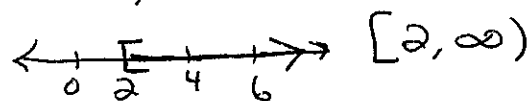


4.  $6 - 5x \leq x - 6$

$$\begin{array}{r} +5x \quad +5x \\ \hline 6 \leq 6x - 6 \\ +6 \quad +6 \\ \hline \end{array}$$

$12 \leq 6x$

$2 \leq x / x \geq 2$

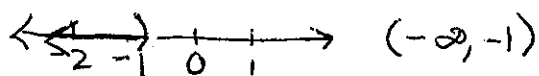


5.  $5 + 2x > 4x + 7$

$$\begin{array}{r} -5 \quad -5 \\ \hline 2x > 4x + 2 \\ -4x \quad -4x \\ \hline \end{array}$$

$-2x > 2$

$x < -1$

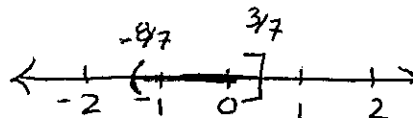


6.  $-6 < 7x + 2 \leq 5$

$$\begin{array}{r} -2 \quad -2 \quad -2 \\ \hline -8 < 7x \leq 3 \end{array}$$

$-8/7 < x \leq 3/7$   $(-8/7, 3/7]$

$(-1.1) \quad (.43)$



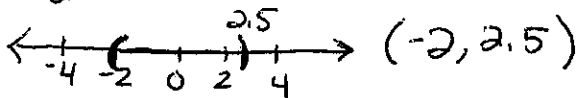
7.  $\frac{1}{2} < 3 - x < 5$

$$\begin{array}{r} -3 \quad -3 \quad -3 \\ \hline \end{array}$$

$-2.5 < -x < 2$

$2.5 > x > -2$

$-2 < x < 2.5$



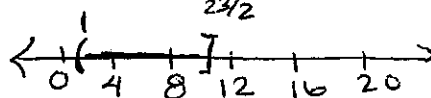
8.  $-16 \leq 7 - 2x < 5$

$$\begin{array}{r} -7 \quad -7 \quad -7 \\ \hline \end{array}$$

$-23 \leq -2x < -2$

$\frac{23}{2} \geq x > 1$

$1 < x \leq 23/2$   $(1, 23/2]$

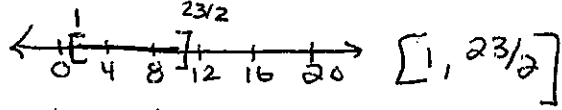


$$9. \frac{-16 \leq 7 - 2x \leq 5}{-7 \quad -7 \quad -7}$$

$$-23 \leq -2x \leq -2$$

$$\frac{23}{2} \geq x \geq 1$$

$$1 \leq x \leq 23/2 \text{ (11.5)}$$



$$11. |3x - 1| > 2$$

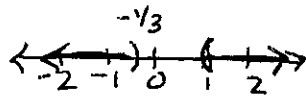
$$3x - 1 > 2 \text{ OR } 3x - 1 < -2$$

$$3x > 3$$

$$x > 1$$

$$3x < -1$$

$$x < -1/3$$



$$(-\infty, -1/3) \cup (1, \infty)$$

$$x < -1/3 \text{ OR } x > 1$$

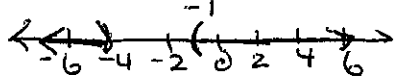
$$13. |2x + 5| > 3$$

$$2x + 5 < -3 \text{ OR } 2x + 5 > 3$$

$$2x < -8$$

$$2x > -2$$

$$x < -4 \text{ OR } x > -1$$



$$(-\infty, -4) \cup (-1, \infty)$$

$$15. (x + 3)^2 \geq 4$$

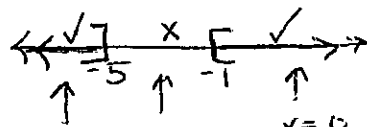
$$\frac{x^2 + 6x + 9 \geq 4}{-4 \quad -4}$$

$$x^2 + 6x + 5 \geq 0$$

$$(x + 5)(x + 1) \geq 0$$

$$x + 5 = 0 \quad | \quad x + 1 = 0$$

$$x = -5 \quad | \quad x = -1$$



$$x = -6 \quad x = -3 \quad x = 0$$

$$9 \geq 4 \quad 0 \geq 4 \quad 9 \geq 4$$

$$(-\infty, -5] \cup [-1, \infty)$$

$$17. (x + 1)^2 \geq 9$$

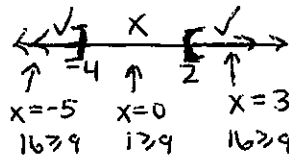
$$\frac{x^2 + 2x + 1 \geq 9}{-9 \quad -9}$$

$$x^2 + 2x - 8 \geq 0$$

$$(x + 4)(x - 2) \geq 0 \quad (-\infty, -4] \cup [2, \infty)$$

$$x + 4 = 0 \quad | \quad x - 2 = 0$$

$$x = -4 \quad | \quad x = 2$$



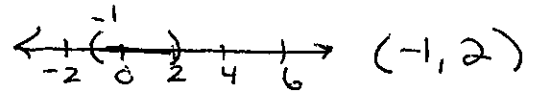
$$x = -5 \quad x = 0 \quad x = 3$$

$$16 \geq 9 \quad 1 \geq 9 \quad 16 \geq 9$$

$$10. -2 < 3x + 1 < 7$$

$$\frac{-1 \quad -1 \quad -1}{-3 < 3x < 6}$$

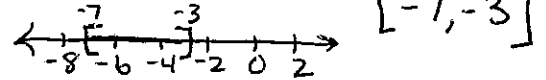
$$-1 < x < 2$$



$$12. |x + 5| \leq 2$$

$$\frac{-2 \leq x + 5 \leq 2}{-5 \quad -5 \quad -5}$$

$$-7 \leq x \leq -3$$



$$[-7, -3]$$

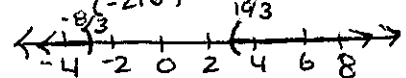
$$14. |3x - 1| > 9$$

$$3x - 1 < -9 \text{ OR } 3x - 1 > 9$$

$$3x < -8$$

$$3x > 10$$

$$x < -8/3 \text{ OR } x > 10/3 \text{ (3.33)}$$



$$(-\infty, -8/3) \cup (10/3, \infty)$$

$$16. (x - 1)^2 \leq 25$$

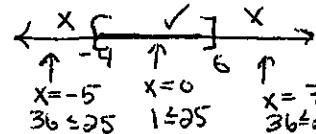
$$\frac{x^2 - 2x + 1 \leq 25}{-25 \quad -25}$$

$$x^2 - 2x - 24 \leq 0$$

$$(x - 6)(x + 4) \leq 0 \quad [-4, 6]$$

$$x - 6 = 0 \quad | \quad x + 4 = 0$$

$$x = 6 \quad | \quad x = -4$$



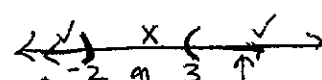
$$18. x^2 - x > 6$$

$$x^2 - x - 6 > 0$$

$$(x - 3)(x + 2) > 0$$

$$x - 3 = 0 \quad | \quad x + 2 = 0$$

$$x = 3 \quad | \quad x = -2 \quad (-\infty, -2) \cup (3, \infty)$$



$$x = -3 \quad x = 0 \quad x = 4$$

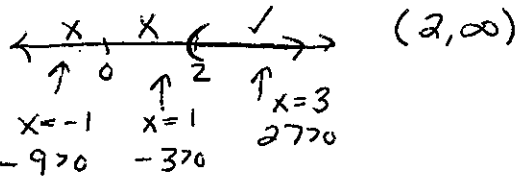
$$12 > 6 \quad 0 > 6 \quad 12 > 6$$

$$19. 3x^3 - 6x^2 > 0$$

$$3x^2(x-2) > 0$$

$$3x^2 = 0 \quad | \quad x-2 = 0$$

$$x=0 \quad | \quad x=2$$



$$20. 2x^2 + 3x \geq 5$$

$$2x^2 + 3x - 5 \geq 0$$

$$P(-10) | S(3)$$

$$5, -2 \quad | \quad \checkmark$$

$$(2x^2 - 2x)(5x - 5)$$

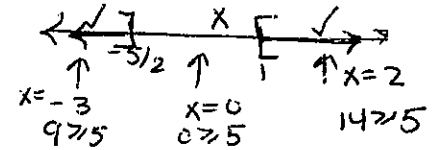
$$2x(x-1) + 5(x-1)$$

$$(2x+5)(x-1)$$

$$(2x+5)(x-1) \geq 0$$

$$2x+5=0 \quad | \quad x-1=0$$

$$x=-5/2 \quad | \quad x=1$$



$$21. \frac{x+16}{3x+2} \leq 5$$

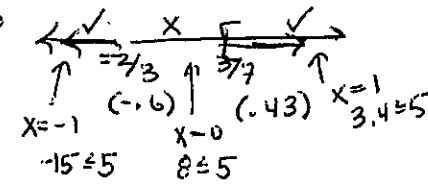
$$-14x+6=0 \quad | \quad 3x+2=0$$

$$x=3/7 \quad | \quad x=-2/3$$

$$\frac{x+16}{3x+2} - \frac{5(3x+2)}{3x+2} \leq 0$$

$$\frac{x+16-15x-10}{3x+2} \leq 0$$

$$\frac{-14x+6}{3x+2} \leq 0$$



$$(-\infty, -2/3] \cup [3/7, 1)$$

$$x \neq -2/3$$

$$22. \frac{x+7}{3x-1} < 1$$

$$x \neq 1/3$$

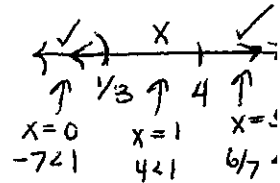
$$\frac{x+7}{3x-1} - \frac{1(3x-1)}{3x-1} < 0$$

$$\frac{x+7-3x+1}{3x-1} < 0$$

$$\frac{-2x+8}{3x-1} < 0$$

$$-2x+8=0 \quad | \quad 3x-1=0$$

$$x=4 \quad | \quad x=1/3$$



$$(-\infty, 1/3) \cup (4, 5)$$

$$24. \frac{4}{x+1} \leq \frac{3}{x+2}$$

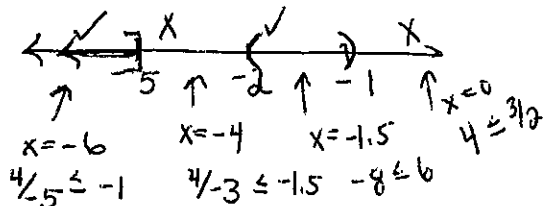
$$\frac{4(x+2)}{(x+1)(x+2)} - \frac{3(x+1)}{(x+1)(x+2)} \leq 0$$

$$\frac{4x+8-3x-3}{(x+1)(x+2)} \leq 0$$

$$\frac{x+5}{(x+1)(x+2)} \leq 0$$

$$x+5=0 \quad | \quad x+1=0 \quad | \quad x+2=0$$

$$x=-5 \quad | \quad x=-1 \quad | \quad x=-2$$



$$(-\infty, -5] \cup (-2, -1)$$

$$23. \frac{3x-7}{x+2} < 1$$

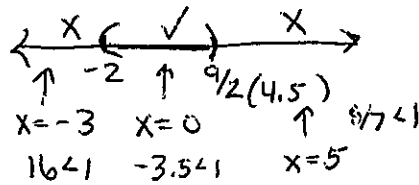
$$\frac{3x-7}{x+2} - \frac{1(x+2)}{x+2} < 0$$

$$\frac{3x-7-x-2}{x+2} < 0$$

$$\frac{2x-9}{x+2} < 0$$

$$2x-9=0 \quad | \quad x+2=0$$

$$x=9/2 \quad | \quad x=-2$$



$$(-2, 9/2)$$

$$x \neq -2$$

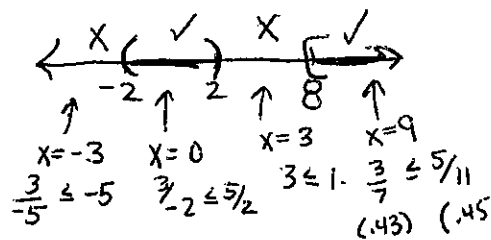
$$25. \frac{3}{x-2} \leq \frac{5}{x+2}$$

$$x \neq \pm 2$$

$$\frac{3(x+2)}{(x-2)(x+2)} - \frac{5(x-2)}{(x-2)(x+2)} \leq 0$$

$$\frac{3x+6-5x+10}{(x-2)(x+2)} \leq 0$$

$$\frac{-2x+16}{(x-2)(x+2)} \leq 0$$



$$(-2, 2) \cup [8, 9)$$

$$-2x+16=0 \quad | \quad x-2=0 \quad | \quad x+2=0$$

$$x=8 \quad | \quad x=2 \quad | \quad x=-2$$