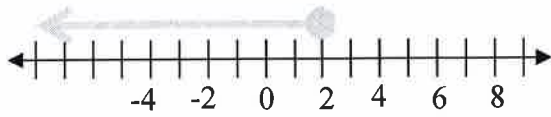


3-1 Inequalities and Their Graphs

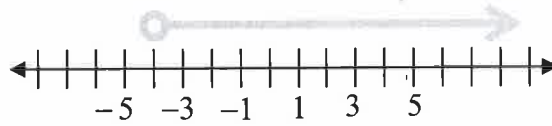
Write the inequality represented by each graph

1.



$$x \leq 2$$

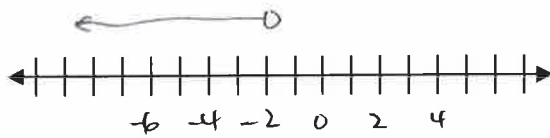
2.



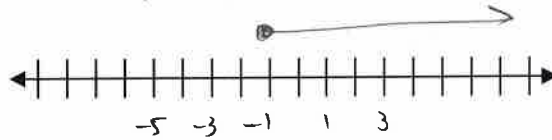
$$x > -4$$

Graph each inequality.

3. $-2 > f$ so $f < -2$



4. $n \geq -1$



5. Define a variable and write an inequality to model this situation: A person must be at most 35 years old to participate in a certain medical study.

let $a = \text{age of person in years}$

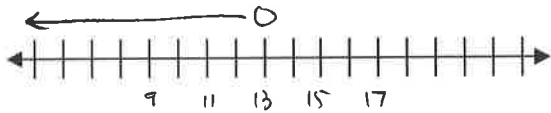
$$a \leq 35$$



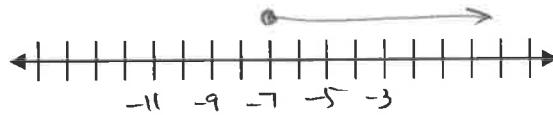
3-2 Solve Inequalities Using + or -

Solve each inequality and graph the solutions.

1. $v - 5 < 8$
 $\begin{array}{r} +5 \quad +5 \\ \hline v < 13 \end{array}$

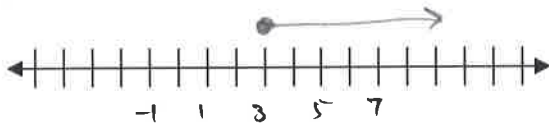


2. $d + 4 \geq -3$
 $\begin{array}{r} -4 \quad -4 \\ \hline d \geq -7 \end{array}$

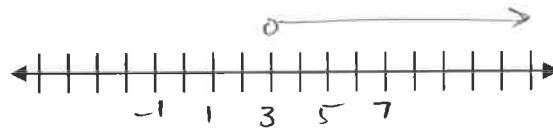


Graph each inequality.

3. $0 \leq 2a - a - 3$
 $\begin{array}{r} 0 \leq a - 3 \\ +3 \quad +3 \\ \hline 3 \leq a \text{ so } a \geq 3 \end{array}$

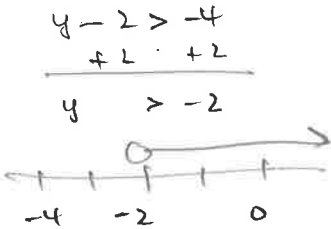


4. $t - 8 > -5$
 $\begin{array}{r} +8 \quad +8 \\ \hline t > 3 \end{array}$



5. Describe and correct the error:

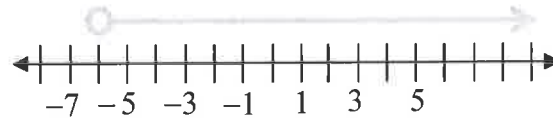
-4 + 2 is not -6, it is -2



$y - 2 > -4$

$+2 \quad +2$

$y > -6$

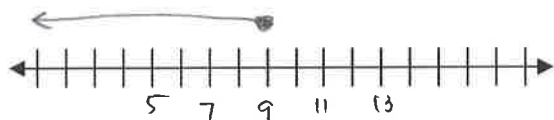


3-3 Solve Inequalities Using \times or \div

Solve each inequality and graph the solutions.

$$1. \quad \frac{5}{3}t \leq 15 \cdot \frac{3}{5} \quad \frac{15 \cdot 3}{5} = \frac{45}{1} = 15$$

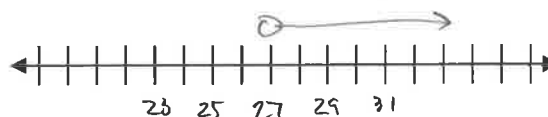
$$\boxed{t \leq 9}$$



$$2. \quad \frac{g}{3} - 2 > 7$$

$$\frac{g}{3} + 2 > 7 + 2$$

$$\frac{g}{3} > 9 \cdot 3 \quad \boxed{g > 27}$$

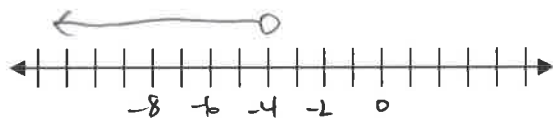


Graph each inequality.

$$3. \quad 6 < -3(x + 2)$$

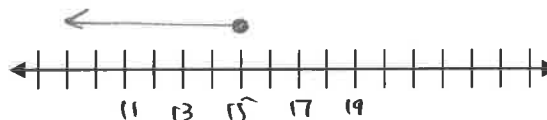
$$6 < -3x - 6$$

$$\frac{12 < -3x}{-3} \quad \frac{-6}{-3} \quad -4 > x \quad \text{so } \boxed{x < -4}$$



$$4. \quad -3(-5) \leq \left(\frac{x}{3}\right)(-3)$$

$$15 \geq x \quad \text{so } x \leq 15$$

**Identify a variable, write an inequality to represent this situation, and solve it.**

5. To remain on the football team, Steven must attend at least $\frac{3}{4}$ of the study hall sessions offered. He attends 12 sessions. If Steven barely met the requirements, what is the maximum number of study hall sessions there could have been? (let x = # study hall sessions)

$$12 \geq \frac{3}{4}x$$

$$\frac{4}{3}(12) \geq x$$

$$16 \geq x$$

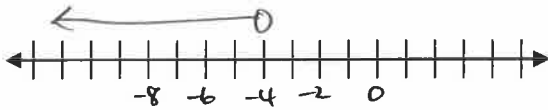
$$\text{so } x \leq 16$$

There could have been at most 16 study hall sessions.

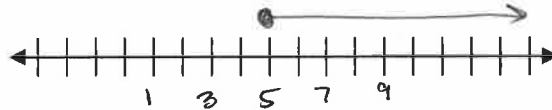
3-4 Solve Multi-Step Inequalities

Solve each inequality and graph the solutions.

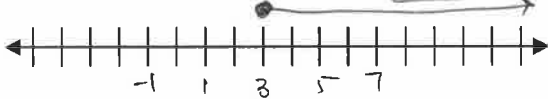
1. $3f - 12 < -24$
 $\quad \quad \quad +12 \quad \quad +12$
 $3f < -12$
 $f < -4$



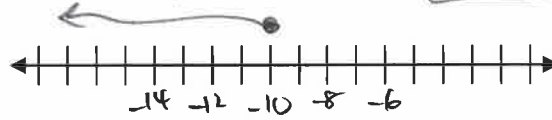
2. $\frac{4}{5}x - 8 \geq -4$
 $\quad \quad \quad +8 \quad \quad +8$
 $\frac{4}{5}x \geq 4$
 $\frac{5}{4}(\frac{4}{5})x \geq 4(\frac{5}{4})$
 $x \geq 5$



3. $2(3 - 4z) \leq -6z$
 $6 - 8z \leq -6z$
 $\quad \quad +8z \quad \quad +8z$
 $6 \leq 2z$
 $\frac{6}{2} \leq \frac{2z}{2}$
 $3 \leq z$
 $z \geq 3$



4. $4(k - 6) + 8 \geq 8(k + 3)$
 $4k - 24 + 8 \geq 8k + 24$
 $4k - 16 \geq 8k + 24$
 $-40 \geq 4k$
 $-10 \geq k$
 $k \leq -10$



Write an inequality to represent the situation. Then solve it.

5. Brad has a budget of \$100 for going to the gym. The gym he uses charges \$25 for a monthly membership and \$4.50 per visit. How many times can Brad go to the gym and spend no more than \$100?

Let x = # times Brad goes to the gym

$$25 + 4.50x \leq 100$$

$$\begin{array}{r} 25 + 4.50x \leq 100 \\ -25 \quad \quad -25 \\ \hline 4.50x \leq 75 \\ x \leq 16.6 \end{array}$$

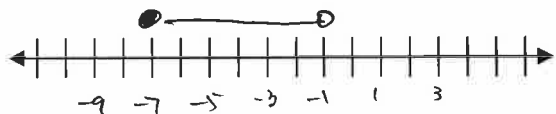
Brad can go to the gym at most 16 times.



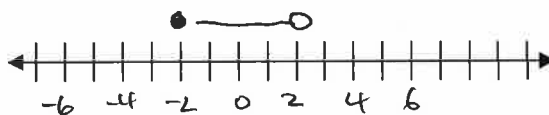
3-6 Compound Inequalities

Solve each compound inequality and graph the solutions.

1.
$$\begin{aligned} -4 &\leq x + 3 < 2 \\ -3 &\quad -3 & -3 \\ \hline -7 &\leq x < -1 \end{aligned}$$

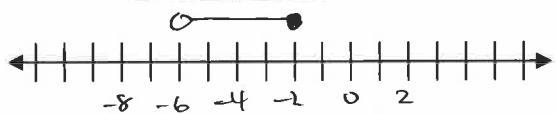


2.
$$\begin{aligned} -1 &\leq \frac{q-2}{4} < 0 \\ -4 &\leq q-2 < 0 \\ -2 &\leq q < 2 \end{aligned}$$

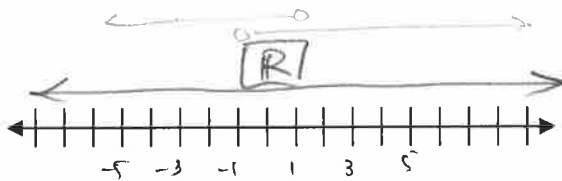


3.
$$\begin{aligned} 3 - p &\geq 5 & \text{and} & & p - 4 &> -10 \\ -p &\geq 2 & & & p &> -6 \\ p &\leq -2 & \text{and} & & p &> -6 \end{aligned}$$

$$-6 < p \leq -2$$



4.
$$\begin{aligned} r - 3 &< -2 & \text{or} & & r - 4 &> -5 \\ r &< 1 & \text{or} & & r &> -1 \end{aligned}$$



5. Write a compound inequality that could represent the graph.



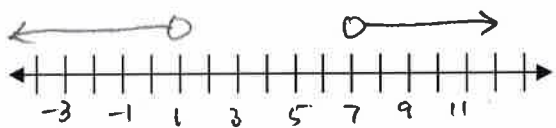
$$-6 < x \leq 2$$



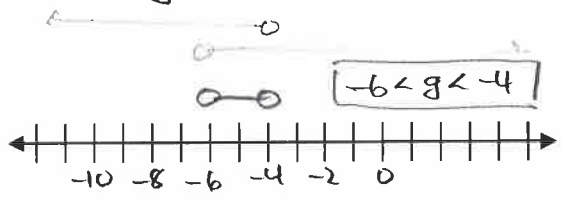
3-7 Absolute Value Equations & Inequalities

Solve each and graph the solutions.

1. $|k - 4| > 3$
 $k - 4 > 3$ or $k - 4 < -3$
 $k > 7$ or $k < 1$

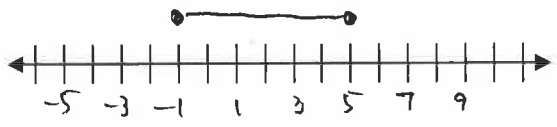


2. $|5 + g| < 1$
 $5 + g < 1$ and $5 + g > -1$
 $g < -4$ and $g > -6$

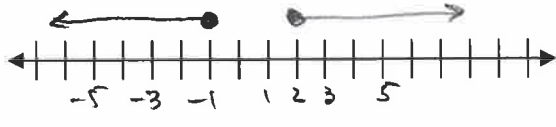


3. $|6 - 3c| \leq 9$
 $6 - 3c \leq 9$ and $6 - 3c \geq -9$
 $-3c \leq 3$ $-3c \geq -15$
 $c \geq -1$ and $c \leq 5$

$-1 \leq c \leq 5$



4. $|4n - 2| \geq 6$
 $4n - 2 \geq 6$ or $4n - 2 \leq -6$
 $4n \geq 8$ $4n \leq -4$
 $n \geq 2$ or $n \leq -1$



5. $2 + 3|x + 4| = 8$
 $3|x + 4| = 6$
 $|x + 4| = 2$

$x + 4 = 2$ or $x + 4 = -2$
 $x = -2$ or $x = -6$

