Algebra 1R – Mr. Bo
Unit 2 – Day 3 Notes

Name:________________________
Date: ______________

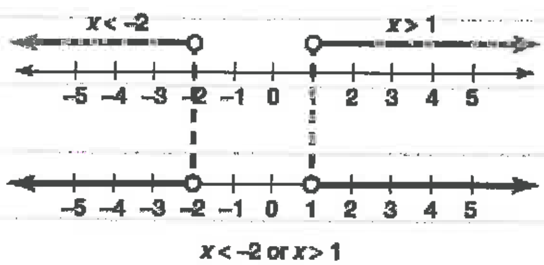
Linear Inequalities

"OR" Statements

The compound inequality shown involves "or" and is a disjunction.

$x < -2$ or $x > 1$

Represent each part above the number line.



The solution is the region that satisfies either inequality. Graphically, the solution is the union, or all the regions, of the separate inequalities.

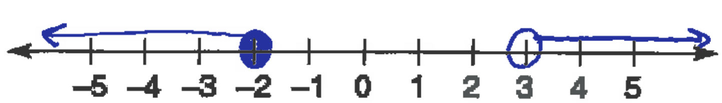
Solve the inequality and represent the solution on a number line.

$x + 10 \le 8 \; or \; -2x < -6$

$$\begin{array}{lll} x+10 \le 8 & \text{or} & -2x < -6 \\ \underline{-10 \quad -10} & & \frac{-2x}{-2} \quad \frac{-6}{-2} \\ x \le -2 & \text{or} & x > 3 \end{array}$$

* Sign flips

x is either less than or equal to -2 or greater than 3.

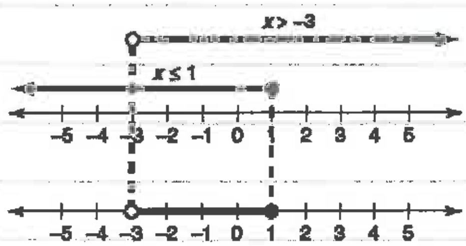


"AND" Statements

The compound inequality shown involves "and" and is a conjunction.

$x \le 1$ and $x > -3$

Represent each part above the number line.



$x \le 1$ and $x > -3$

$-3 < x \le 1$

The solution is the region that satisfies both inequalities. Graphically, the solution is the overlapping, or the intersection, of the separate inequalities.

Rewrite the compound inequality in compact form and solve.

$$6(x+1) > 0 \; and \; 6(x+1) \le 36$$

Compact form: $0 < 6(x+1) \le 36$

$0 < 6x+6 \le 36$

$-6 \quad\quad -6 \quad\quad -6$

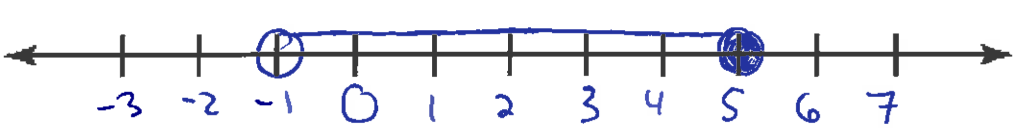
$-6 < 6x \le 30$

$\frac{-6}{6} < \frac{6x}{6} \le \frac{30}{6}$

$-1 < x \le 5$

x is greater than −1 and less than or equal to 5.

Graph the solution on a number line.

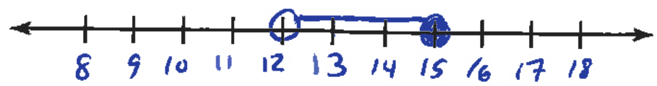


Solve each inequality and graph the solution on a number line.

a. $6 < x - 6 \leq 9$

$+6 \quad +6 \quad +6$

$12 < x \leq 15$



b. $1 + 6x > 11$ or $x - 4 < -5$

$-1 \quad -1$

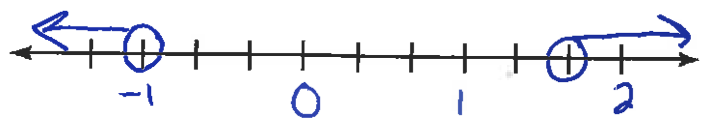
$6x > 10$

$x \geq \frac{10}{6}$

$x > \frac{5}{3}$ or

$+4 \quad +4$

$x < -1$



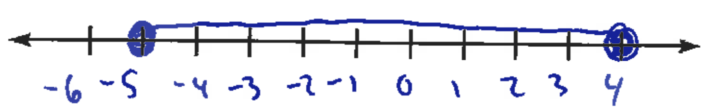
c. $-7 \leq -2\left(x - \frac{1}{2}\right) \leq 11$

$-7 \leq -2x + 1 \leq 11$

$-1 \quad -1 \quad -1$

$\frac{-8}{-2} \leq \frac{-2x}{-2} \leq \frac{10}{-2}$

$4 \geq x \geq -5$



d. $2x + 7 < 10$ or $-2x + 7 > 10$

$-7 \quad -7$

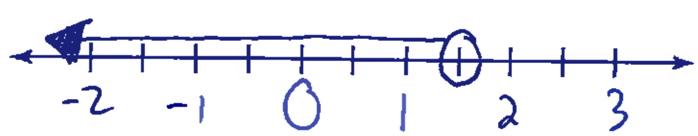
$2x < 3$

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

$-7 \quad -7$

$\frac{-2x}{-2} > \frac{3}{-2}$

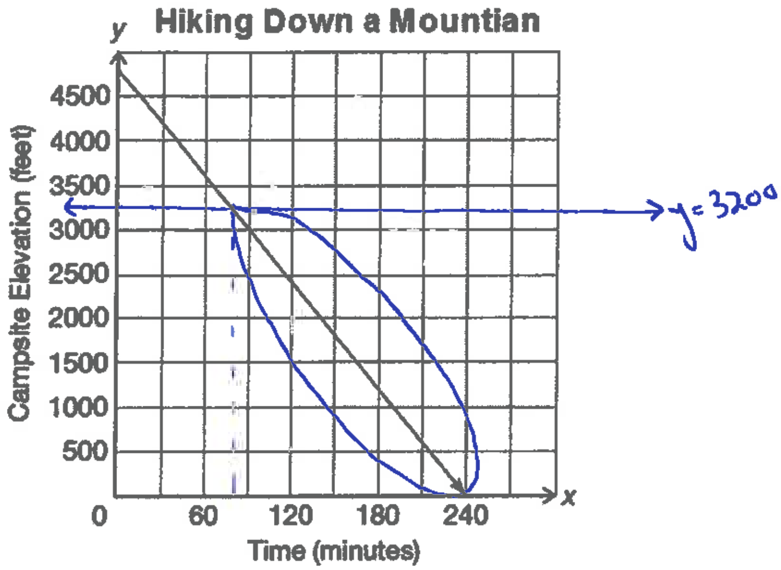
$x < -\frac{3}{2}$



Be prepared to share your solutions and methods.

Modeling Linear Inequalities

Alan's camping troop hikes down from their campsite at an elevation of 4800 feet to the bottom of the mountain.



a. Identify the independent and dependent quantities and their units of measure.

I: time (minutes)

D: Elevation (feet)

b. Identify the x – intercept and the y-intercept and explain their meaning in the context of the situation.

x-intercept = 240 min – the time the reach the bottom.

y-intercept = 4800 ft – the height they start hiking

c. Calculate the rate of change between the points (90, 3000) and (240, 0). Explain what the rate means in the context of this situation.

$$\text{rate} = \frac{3000 - 0}{90 - 240} = \frac{3000}{-150} = -20$$

they decend 20 feet every min.

d. Use the graph to determine how many minutes passed if the troop is below 3200 feet. Draw an oval on the graph to represent this part of the function and write the corresponding inequality statement.

they drop below 3200 feet after 80 minutes.

$t > 80$

e. Using the equation $h(t) = -20t + 4800$ as a model for the linear function, write and solve an inequality to verify the solution set you interpreted from part d.

$$3200 > -20t + 4800$$
$$-4800 \qquad -4800$$
$$-1600 > -20t$$

$$\frac{-1600}{-20} > \frac{-20t}{-20}$$

$$80 < t$$