

## warm up: page 42- Example 4

Example 4: Application

The maximum safe load of a chairlift is 500 lb. A cyclist rides the chairlift with his bicycle. The cyclist weighs 160 lb, and the bicycle weighs 30 lb. Which inequality best describes how much additional weight (w) the chairlift could safely carry?



Cyclist +  
bike +  
add'l  
wt  $\leq 500$

$$160 + 30 + w \leq 500$$

$$190 + w \leq 500$$

$$w \leq 310$$

✓ Understanding Check:

p42

To help out a homeless shelter, your class brought in 52 blankets on Monday and 61 blankets on Wednesday. Write an inequality to describe how many blankets the class must donate on Friday to make or exceed their goal of at least 150 blankets.

Let  $b$  = # blankets on Friday

$$52 + 61 + b \geq 150$$

$$113 + b \geq 150$$

$$b \geq 37$$

**answers HW page 28**Identify all solutions to each inequality:

1.  $x < 11$

a. -3   b. 0   c. 11   d. 16

2.  $x > 5$

a. -7   b. 0   c. 5   d. 9

3.  $x \leq -6$

a. -10   ~~b. -5~~   c. -6   d. 0

4.  $x \geq 2$

a. -7   b. 0   c. 2   d. 8

5.  $2x > 7$

a. -9   b. 0   c. 4   d. 9

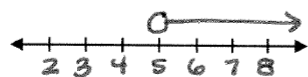
6.  $x + 3 < -2$

a. -7   b. -5   c. -4   d. 4

**answers HW page 28**

Graph each inequality below: (watch out for open or closed point)

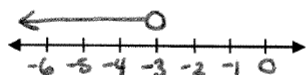
7.  $x > 5$



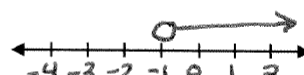
8.  $x \leq 10$



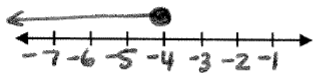
9.  $x < -3$



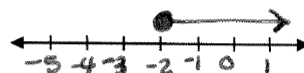
10.  $x > -1$



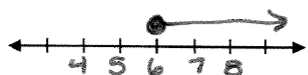
11.  $x \leq -4$



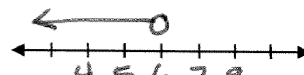
12.  $x \geq -2$



13.  $x \geq 6$



14.  $x < 6$



**answers HW page 29**

1. The winner of the tournament will win at least \$5,000 in cash and prizes.

Let  $x$  = dollars      Inequality:  $x \geq 5000$

2. To train for the marathon, Julia ran over 30 miles each week.

Let  $x$  = miles      Inequality:  $x > 30$

3. To lose weight, most people need to eat at most 1,600 calories a day.

Let  $x$  = calories      Inequality:  $x \leq 1600$

**answers HW page 29**

4. The average car on the road today has less than 42,000 miles on it.

Let  $x$  = miles      Inequality:  $x < 42,000$

5. Top tweeters, average over 130 tweets a day.

Let  $x$  = tweets      Inequality:  $x > 130$

Review:

$$\begin{array}{r} 4x - 2 = 10 \\ \quad \quad \quad \rightarrow +2 \\ \hline 4x = 12 \\ \quad \quad \quad \div 4 \\ \hline x = 3 \end{array}$$

$$\begin{array}{r} 2. -6x + 3 = 2x - 21 \\ -2x \quad \leftarrow \quad -3 \\ \hline -8x = -24 \\ \frac{-8}{-8} = \frac{-24}{-8} \\ \boxed{x = 3} \end{array}$$

$$\begin{array}{r} 3. 6|x| - 2 = 22 \\ +2 \quad +2 \\ \hline 6|x| = 24 \\ \hline \frac{6|x|}{6} = \frac{24}{6} \\ |x| = 4 \\ \hline \boxed{x = 4 \text{ or } -4} \end{array}$$

## answers HW page 30

## With Addition Property of Inequality

Date \_\_\_\_\_ Per \_\_\_\_\_

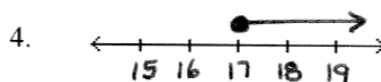
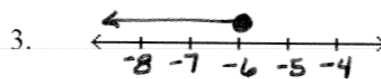
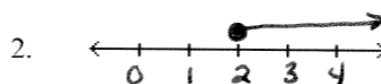
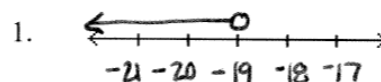
Problems Set:

$$1. \begin{array}{r} k + 20 < 1 \\ -20 \quad -20 \\ \hline k < -19 \end{array}$$

$$2. \begin{array}{r} k - 7 \geq -1 \\ +3 \quad +3 \\ \hline k \geq 2 \end{array}$$

$$3. \begin{array}{r} a + 16 \leq 10 \\ -16 \quad -16 \\ \hline a \leq -6 \end{array}$$

$$4. \begin{array}{r} 24 \leq p + 7 \\ -7 \quad -7 \\ \hline 17 \leq p \\ p \geq 17 \end{array}$$

Number Lines:



## answers HW page 30

$$5. \begin{array}{r} -9 + x > -2 \\ +9 \quad +9 \\ \hline \end{array}$$

$$\boxed{x > 7}$$

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

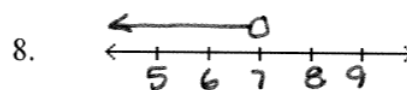
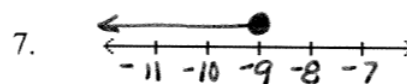
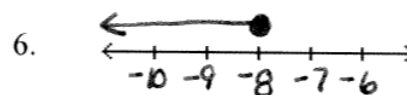
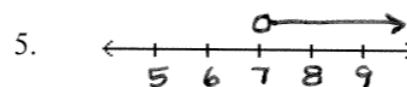
$$\boxed{x \leq -8}$$

$$7. \begin{array}{r} -13 \geq n - 4 \\ +4 \quad +4 \\ \hline \end{array}$$

$$\boxed{n \leq -9}$$

$$8. \begin{array}{r} -5 + x < 2 \\ +5 \quad +5 \\ \hline \end{array}$$

$$\boxed{x < 7}$$



## answers HW page 30

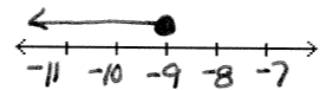
9.  $\underline{6x} + 2 - \underline{5x} \leq -7$

$$\begin{array}{r} x + 2 \leq -7 \\ -2 \quad -2 \\ \hline x \leq -9 \end{array}$$

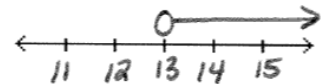
10.  $\underline{-3x} - 5 + \underline{4x} > 8$

$$\begin{array}{r} x - 5 > 8 \\ +5 \quad +5 \\ \hline x > 13 \end{array}$$

9.



10.



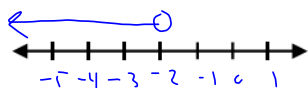
## page 44

Example 1: Multiplying by a Positive Number

Solve and graph:

a.  $2 \cdot \frac{x}{2} < -1 \cdot 2$

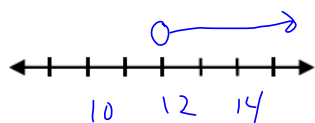
$x < -2$

Step 1: multiply
[http://www.youtube.com/watch?feature=player\\_detailpage&v=sWrNyRaHzmc](http://www.youtube.com/watch?feature=player_detailpage&v=sWrNyRaHzmc)
Example 2: Multiplying by a Negative Number

Solve and graph:

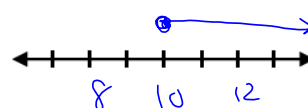
a.  $3 \left( -\frac{x}{3} \right) < -4 \cdot -3$

$x > 12$

 Step 1: multiply  
 Step 2: flip the symbol


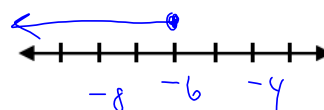
b.  $\frac{2}{5}n \geq 4 \cdot \frac{5}{2}$

$n \geq 10$



b.  $\frac{-3}{2} \left( -\frac{2}{3}n \right) \geq 4 \cdot -\frac{3}{2}$

$n \leq -6$



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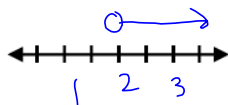
## 3-4 Solving Multi-Step Inequalities

**Example 1: Using More Than One Step**

Solve and graph:

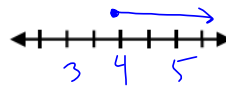
a.  $7 + 6a > 19$

$$\begin{array}{r} -7 \\ 6a > 12 \\ a > 2 \end{array}$$

Step 1: SOLVE  
Step 2: SOLVE

b.  $-5x - 3 \leq -23$

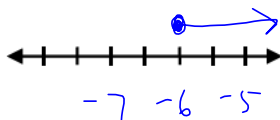
$$\begin{array}{r} -5x \leq -20 \\ x \geq 4 \end{array}$$

Step 1: add 3  
Step 2: div -5  
Step 3: flip sign**✓ Understanding Check:**

Solve each inequality and graph the solution:

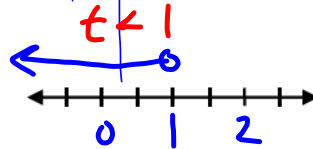
a.  $-3x - 4 \leq 14$

$$\begin{array}{r} -3x \leq 18 \\ x \geq -6 \end{array}$$

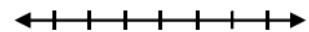


b.  $5 < -2t + 7$

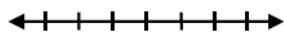
$$\begin{array}{r} -2 < -2t \\ 1 > t \end{array}$$



c.  $5n + 22 < -8$

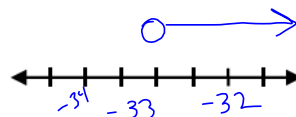


d.  $-x + 22 \leq 14$

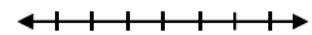


e.  $\frac{x}{3} + 9 > -2$

$$\begin{array}{r} \frac{x}{3} > -11 \\ x > -33 \end{array}$$

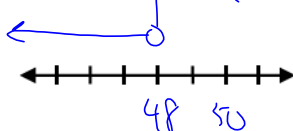


f.  $-\frac{x}{4} + 5 > -1$

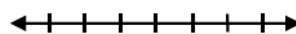


g.  $-42 < -n + 6$

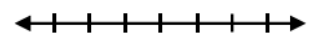
$$\begin{array}{r} -48 < -n \\ 48 > n \end{array}$$



h.  $2x + 8 \leq 8$



i.  $-\frac{1}{4}x - 5 > -2$

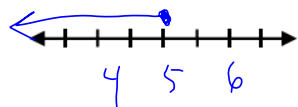


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Example 3: Using the Distributive Property in Inequalities

Solve:  $2(t+2) - 3t \geq -1$

$$\begin{array}{rcl}
 2t + 4 - 3t & \geq & -1 \\
 -1t + 4 & \geq & -1 \\
 -1t & \geq & -5 \\
 t & \leq & 5
 \end{array}$$



- Step 1: distrib  
 Step 2: C.L.T.  
 Step 3: sub 4  
 Step 4: div by -1 & flip  
 Step 5: graph  
 Step 6: \_\_\_\_\_

✓ Understanding Check:

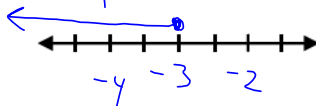
Solve each inequality and check your solution mentally:

a.  $4p + 2(p + 7) < 8$

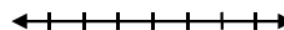


b.  $15 \leq 5 - 2(4m + 7)$

$$\begin{array}{rcl}
 10 & \leq & -8m - 14 \\
 24 & \leq & -8m \\
 -3 & \leq & m
 \end{array}$$



c.  $8 > 3(5 - g) + 2$



page 47 continued...

**Example 4: Inequalities with Variables on Both Sides of the Inequality**

Solve:  $-6x - 18 < 4x + 12$

Step 1: \_\_\_\_\_

Step 2: \_\_\_\_\_

Step 3: \_\_\_\_\_

Step 4: \_\_\_\_\_

Step 5: \_\_\_\_\_

Step 6: \_\_\_\_\_

Check:

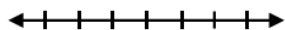


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**Example 5: Multi-Step Inequalities**Solve:  $-3(-4 - m) \geq 2(4m - 14)$ 

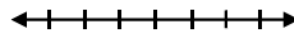
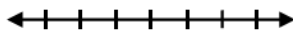
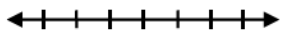
Step 1: \_\_\_\_\_  
 Step 2: \_\_\_\_\_  
 Step 3: \_\_\_\_\_  
 Step 4: \_\_\_\_\_  
 Step 5: \_\_\_\_\_  
 Step 6: \_\_\_\_\_

Check:

**✓ Understanding Check:**

Solve and check your solution mentally:

a.  $-6(x - 4) \geq 7(2x - 3)$       b.  $4(3m - 1) \leq 2(m + 3)$       c.  $5a - 2(a - 15) > 10 - a$



**Homework:**

**HW page 35**



