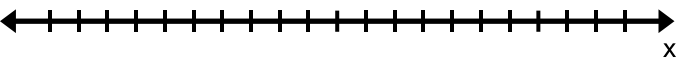
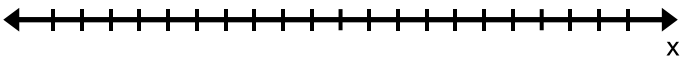
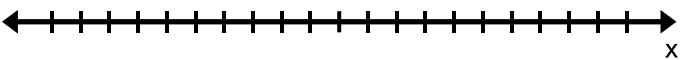
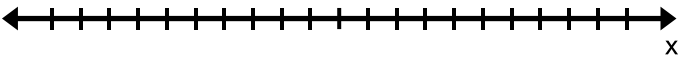


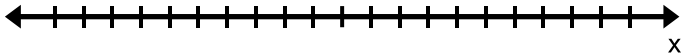
Use mental math to solve the following, and graph the solutions on the number line. Then write a compound inequality to represent the graph.

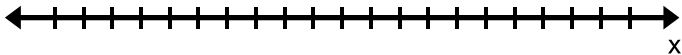
1. a) $|x + 3| = 5$  equality:

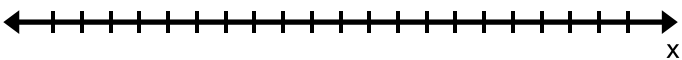
b) $|x + 3| \leq 5$  inequality:

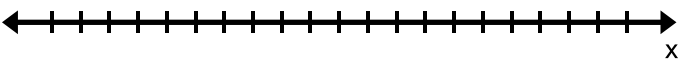
c) $|x + 3| \geq 5$  inequality:

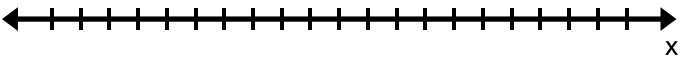
d) $|x + 3| < 5$  inequality:

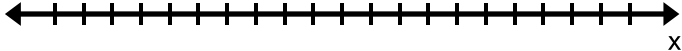
e) $|x + 3| > 5$  inequality:

2. a) $|x - 4| = 6$  equality:

b) $|x - 4| \leq 6$  inequality:

c) $|x - 4| \geq 6$  inequality:

d) $|x - 4| < 6$  inequality:

e) $|x - 4| > 6$  inequality:

3. What kinds of patterns did you notice for the first two sets of problems?

4. Check to see if the following integers are solutions to this inequality: $|10 - x| \leq 15$

- a) 1 b) 30 c) -11 d) 0 e) -5

5. When you solved #1a on the front page, you got $x = 2$ or $x = -8$ as possible solutions. This would mean that you could have rewritten $|x + 3| = 5$ as $x + 3 = 5$ and solved it to get $x = 2$. How could you set up $|x + 3| = 5$ to get an equation with $x = -8$ as a solution?

6. Use the equation from #2a: $|x - 4| = 6$ to write two equations you can solve algebraically to arrive at $x = 10$ or $x = -2$ for solutions.

7. Jimmy and Susie sit next to each other in math class. Their teacher asked them to solve this inequality:
 $|x + 4| - 3 = 5$

Jimmy solved it this way:

$$\begin{array}{lcl}
 |x + 4| - 3 = 5 & & \text{(wrote two equations)} \\
 x + 4 - 3 = 5 & \text{or} & x + 4 - 3 = -5 & \text{(combined 4 and -3 to get 1)} \\
 x + 1 = 5 & \text{or} & x + 1 = -5 & \text{(subtracted 1 from each side)} \\
 x = 4 & \text{or} & x = -6 &
 \end{array}$$

Susie solved it this way:

$$\begin{array}{lcl}
 |x + 4| - 3 = 5 & & \\
 |x + 4| = 8 & \text{(added 3 to both sides to isolate the absolute value grouping.)} & \\
 x + 4 = 8 & \text{or} & x + 4 = -8 & \text{(wrote two equations)} \\
 x = 4 & \text{or} & x = -12 & \text{(subtracted 4 from each side)}
 \end{array}$$

Check the solutions to decide who solved it correctly.

What does this tell you about when to separate the absolute value into 2 equations?

Solve the following. Then graph the solutions on the number line and write the compound inequality representing the solutions.

8. $2|x + 5| + 7 = 19$

9. $2|x + 5| + 7 \geq 19$

