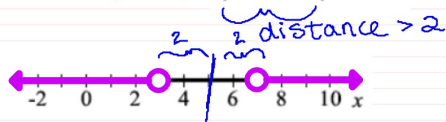## 5.3.3: Absolute Value Inequality Application

1. The solution to the inequality $|x - 5| > 2$ is graphed below.

What is the significance of the 2 when the inequality is graphed?

It represents moving a distance of 2 in each direction, so it gives your points.

What is the significance of the 5 when the inequality is graphed?

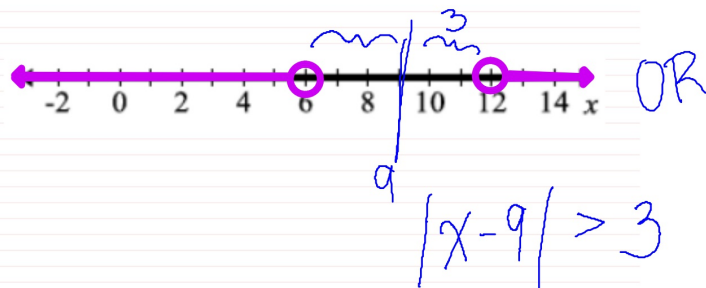5 is the number in which you move 2 from, so it's the middle of the two points.

average: $\frac{3+7}{2} = \frac{10}{2} = 5$

2. The solution to the inequality $|x - 7| \leq 4$ is graphed below.
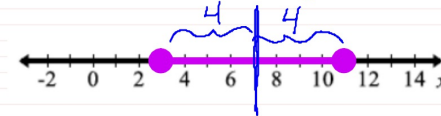
distance ≤ 4

**What is the significance of the 4 when the inequality is graphed?**

It represents moving a distance of 4 in each direction, so it gives your points.

What is the significance of the 7 when the inequality is graphed?

7 is the number in which you move 4 from, so it's the middle of the two points.

3. Write the absolute value inequality for each graph.

AND

Average
$\frac{17+25}{2} = \frac{42}{2} = 21$

$$|x - 21| \leq 4$$

OR

$$|x - 9| > 3$$

4. The average life span of a hamster is 30 months. Most hamsters will live within 6 months from the average.

a) Graph the situation.
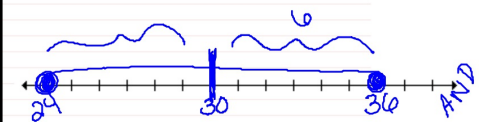
b) Write an absolute value inequality to determine how long most hamsters live.

$$|x - 30| \leq 6$$

c) Solve the inequality.

$x - 30 \leq 6$ $-(x-30) \leq 6$
$\underline{+30 \ +30}$ $-x + 30 \leq 6$
$x \leq 36$ $\underline{-30 \ -30}$
              $\frac{-x \leq -24}{-1 \quad -1}$
              $x \geq 24$

d) Write your solution as a compound inequality.
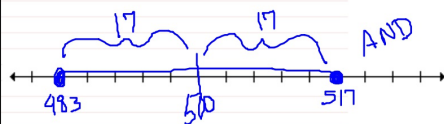
$24 \leq x \leq 36$

5. A pound bag of M&M's has a total average of 500 M&M's. The total M&M's should not vary by more than 17 M&M's.

a) Graph the situation.

b) Write an absolute value inequality to determine how many M&M's should be in a pound bag.

$$|x - 500| \leq 17$$

c) Solve the inequality.

$x - 500 \leq 17$
$+500 \quad +500$
$x \leq 517$

$-(x - 500) \leq 17$
$-x + 500 \leq 17$
$-500 \quad -500$
$\dfrac{-x \leq -483}{-1 \quad -1}$
$x \geq 483$

d) Write your solution as a compound inequality.
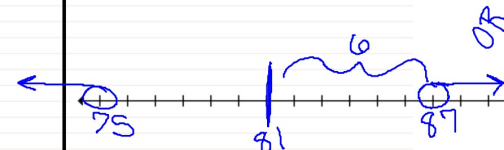
$483 \leq x \leq 517$

6. The average test score was 81%. Students who scored lower than 6% of the average were going to receive extra help while students who scored higher than 6% of the average were going to do an activity.

a) Graph the situation.

b) Write an absolute value inequality to determine what score the students earned if they are receiving extra help or doing an activity.

$$|x - 81| > 6$$

c) Solve the inequality.

$x - 81 > 6$
$+81 \quad +81$
$x > 87$

$-(x - 81) > 6$
$-x + 81 > 6$
$-81 \quad -81$
$\dfrac{-x > -75}{-1 \quad -1}$
$x < 75$

d) Write your solution as a compound inequality.

$x < 75 \text{ or } x > 87$