

Name: \_\_\_\_\_  
PCH: Geometric Approach to Absolute Value

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Do Now:

1. A closed tin can with height  $h$  and radius  $r$  has volume 5 cubic centimeters. Express the surface area of the tin can as a function of  $r$ .

**Geometric Definition of Absolute Value:**

$$|x|$$

$$|x - a|$$

$$|x + a|$$

Examples:

Solve each of the following using the geometric definition of absolute value.

1.  $|x| = 3$

2.  $|x - 6| = 5$

3.  $|x - 1| = 2$

4.  $|x - 1| < 2$

5.  $|3x - 1| = 9$

6.  $|6x + 4| = -8$

$$7. |2x+1| \leq 3$$

$$8. |7+3x| \geq 2$$

$$9. |4x-3| > 5$$

$$10. |6-5x| \geq 16$$

$$11. \left| \frac{5-x}{4} \right| \geq 1$$

$$12. |x+4| < -1$$

13.  $|x+4| > -1$

14.  $|x| > 0$

15.  $\left| \frac{x+1}{2} \right| \leq 4$

16.  $3 - |2x+4| \leq 1$

**Practice**

1.  $|x| \leq 7$

2.  $|t| \geq 5$

3.  $|y-5| = 3$

4.  $|t-3| < 4$

5.  $|5-y| > 3$

6.  $|x+8| \geq 3$

7.  $|x+1| \leq 5$

8.  $|3x-7| \leq 4$

9.  $|5y+2| \geq 8$

10.  $|4-2t| > 6$

11.  $|10+4s| < 6$

12.  $|7m+11| = 3$

$$13. |4 - 5n| \leq 8$$

$$14. \left| \frac{1}{2}x - \frac{3}{4} \right| < 2$$

$$15. \left| \frac{1}{3}y + \frac{5}{6} \right| = 1$$

$$16. \left| \frac{x-2}{3} \right| < 2$$

$$17. 8 - |2x - 1| \geq 6$$

$$18. 7|x + 2| + 5 > 4$$

**Note:** For all real numbers  $x$  and  $a$ :  $|a - x| = |x - a|$

