

Name _____

Period _____

Date _____

READY

Topic: Solving absolute value equations.

Solve for x . (You will have two answers.)

1. $|x| = 7$

$x = 7, x = -7$

2. $|x - 6| = 3$

$x - 6 = 3 \quad x - 6 = -3$
 $x = 9, x = 3$

3. $|w + 4| = 11$

$w + 4 = 11 \quad w + 4 = -11$
 $w = 7 \quad w = -15$

4. $-9|m| = -63$

$|m| = 7$
 $m = 7, m = -7$

5. $|3d| = 15$

$3d = 15 \quad 3d = -15$
 $d = 5 \quad d = -5$

6. $|3x - 5| = 11$

$3x - 5 = 11 \quad 3x - 5 = -11$
 $x = 16/3 \quad x = -2$

7. $-|m + 3| = -13$

$|m + 3| = 13$
 $m + 3 = 13 \quad m + 3 = -13$
 $m = 10 \quad m = -16$

8. $|-4m| = 64$

$-4m = 64 \quad -4m = -64$
 $m = -16 \quad m = 16$

9. $2|x + 1| - 7 = -3$

$2|x + 1| = 4$
 $|x + 1| = 2$
 $x + 1 = 2 \quad x + 1 = -2$
 $x = 1 \quad x = -3$

10. $5|c + 3| - 1 = 9$

$5|c + 3| = 10$
 $|c + 3| = 2$
 $c + 3 = 2 \quad c + 3 = -2$
 $c = -1 \quad c = -5$

11. $-2|2p - 3| - 1 = -11$

$-2|2p - 3| = -10$
 $|2p - 3| = 5$
 $2p - 3 = 5 \quad 2p - 3 = -5$
 $p = 4 \quad p = -1$

12. Explain why the equation $|m| = -3$ has no solution.

Handwritten: Absolute value is distance from 0 on the # line.

SET Distance cannot be negative

Which of these is a solution to the given inequality? Justify your answer.

1. $|4x + 1| \leq 11$

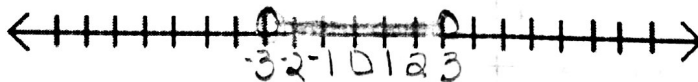
- a. $x = 3$ Yes or No $13 \leq 11$
- b. $x = -1$ Yes or No $3 \leq 11$
- c. $x = 2.5$ Yes or No $11 \leq 11$

2. $3|7 - 2x| + 5 > 14$

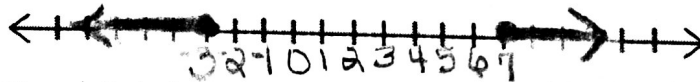
- a. $x = 3$ Yes or No $8 > 14$
- b. $x = -1$ Yes or No $32 > 14$
- c. $x = 2.5$ Yes or No $11 > 14$

Show the solution for each inequality on the number line provided.

3. All the numbers that are less than 3 units from 0



4. All the numbers that are at least 5 units away from 2.



5. All numbers such that when you add 3, the result is no more than 8.

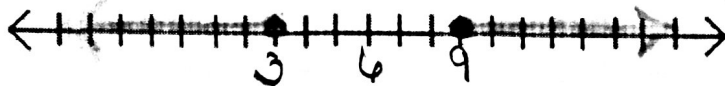
*Not absolute value

$x + 3 \leq 8$



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 MORE FUNCTIONS, MORE FEATURES

6. All values of x for which $|x - 6| \geq 3$



Solve each inequality algebraically.

7. $|3 - x| > 10$ or $3 - x < -10$ $\left\{ \begin{array}{l} (-\infty, -7) \\ (13, \infty) \end{array} \right.$
 $-x > 7$ or $-x < -13$
 $x < -7$ or $x > 13$

8. $|2x + 5| \leq 21$
 $2x + 5 \leq 21$ and $2x + 5 \geq -21$ $\left\{ \begin{array}{l} -13 \leq x \leq 8 \\ [-13, 8] \end{array} \right.$
 $2x \leq 16$ $2x \geq -26$
 $x \leq 8$ $x \geq -13$

9. $22 \geq |12 + x|$
 $12 + x \leq 22$ and $12 + x \geq -22$ $\left\{ \begin{array}{l} -34 \leq x \leq 10 \\ [-34, 10] \end{array} \right.$
 $x \leq 10$ $x \geq -34$

10. $-4|4x - 3| > -28$
 $4x - 3 < 7$ and $4x - 3 > 7$ $\left\{ \begin{array}{l} -1 < x < 5/2 \\ (-1, 5/2) \end{array} \right.$
 $4x \leq 10$ $4x > -4$
 $x \leq 5/2$ $x > -1$

11. $|7 - x| + 4 < 10$
 $7 - x < 6$ and $7 - x > -6$ $\left\{ \begin{array}{l} 1 < x < 13 \\ (1, 13) \end{array} \right.$
 $-x < -1$ $-x > -13$
 $x > 1$ $x < 13$

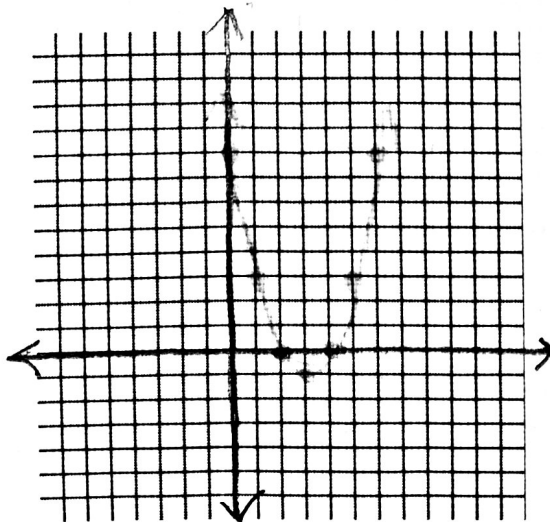
12. $5|3x + 11| - 29 \leq -4$
 $3x + 11 \leq 5$ and $3x + 11 \geq -5$ $\left\{ \begin{array}{l} [-16/3, 2] \\ -16/3 \leq x \leq 2 \end{array} \right.$
 $3x \leq -6$ $3x \geq -16$
 $x \leq -2$ $x \geq -16/3$

13. As Lily thought about her learning, she wondered how her work would apply to a specific distance, not just "closer than" or "further than". Describe how you would find the number(s) Mo could stand on to be exactly 9 feet from the sensor in the flower bed.

- Symbol would be =
- Graph would be two dots, but no shading
- To solve, isolate abs. value, then set the expression in the abs. value equal to the # & equal to the opposite of the #

GO Graph each function. Be sure to label your work.

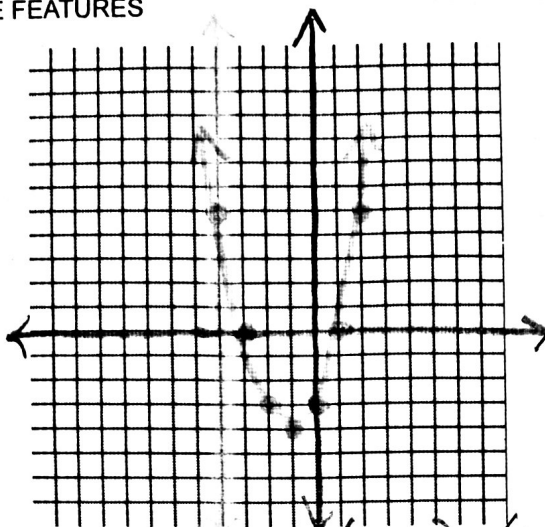
$f(x) = (x - 3)^2 - 1$



a. Identify the x-intercept(s) for this graph. (2, 0), (4, 0)

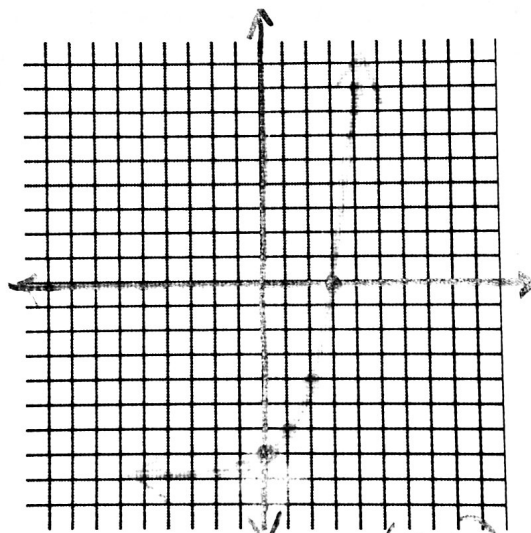
Math 3 // UNIT 1
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14. $f(x) = (x + 1)^2 - 4$



a. Identify the x-intercept(s) for this graph. $(-3, 0), (-1, 0)$

15. $f(x) = 2^x - 8$



a. Identify the x-intercept(s) for this graph. $(3, 0)$