

1. True

2. Absolute Value - the distance a number is from zero on the real number line.

3. Step 1 - isolate the absolute value part on one side of the equation

example $3|x-4| + 1 = 10$

isolate the $|x-4| =$

Step 2 - set the expression inside the absolute value equal to the positive/negative of the number on the right; then solve each equation

example $|x-4| = 3$

solve: $x-4 = 3$ and $x-4 = -3$

4. Infinite

$$5. \quad |-3| = 3$$

$$6. \quad |15| = 15$$

$$7. \quad -|-9| = -9$$

$$8. \quad |-6| - (-7) = 6 + 7 = 13$$

$$9. \quad -5(|12| - |-4|) = -40$$

$$\begin{aligned} -5(|12| - |-4|) &= \\ -5(12 - 4) &= \\ -5(8) &= -40 \end{aligned}$$

10. $|x^2|$ for $x = -5.6$

$$(-5.6)^2 = 31.36$$

$$11. \quad |2x + 4| = 12$$

$$2x + 4 = 12 \quad \text{and} \quad 2x + 4 = -12$$

$$2x = 8$$

$$x = 4$$

$$2x = -16$$

$$x = -8$$

$$12. \quad 4|x - 3| = 8$$

$$\frac{4|x - 3|}{4} = \frac{8}{4}$$

$$|x - 3| = 2$$

$$x - 3 = 2$$

$$x = 5$$

and

$$x - 3 = -2$$

$$x = 1$$

$$13. \quad -3|x + 5| + 21 = 12$$

$$\begin{array}{r} -3|x + 5| + 21 = 12 \\ -21 \quad -21 \\ \hline \end{array}$$

$$-3|x + 5| = -9$$

$$\frac{-3|x + 5|}{-3} = \frac{-9}{-3}$$

$$|x + 5| = 3$$

$$x + 5 = 3$$

$$x = -2$$

and

$$x + 5 = -3$$

$$x = -8$$

$$14. \quad \frac{2}{3}|2x + 7| = 3$$

$$\frac{2}{3}|2x + 7| = 3$$

$$\frac{3}{2} \cdot \frac{2}{3}|2x + 7| = 3 \cdot \frac{3}{2}$$

$$|2x + 7| = 9/2$$

$$2x + 7 = 9/2 \quad \text{and} \quad 2x + 7 = -9/2$$

$$2x = -\frac{5}{2}$$

$$x = -5/4$$

$$2x = -\frac{23}{2}$$

$$x = -23/4$$

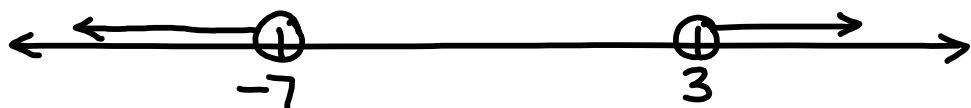
$$15. \quad |2x + 4| > 10$$

$$-10 > 2x + 4 > 10$$

$$-14 > 2x > 6$$

$$-7 > x > 3$$

$$x < -7 \quad \text{or} \quad x > 3$$



16. $|x - 5| \leq 15$

$$|x - 5| \leq 15$$

$$-15 \leq x - 5 \leq 15$$

$$\begin{array}{ccc} +5 & +5 & +5 \end{array}$$

$$-10 \leq x \leq 20$$



17. $|3x + 8| \geq 20$

$$|3x + 8| \geq 20$$

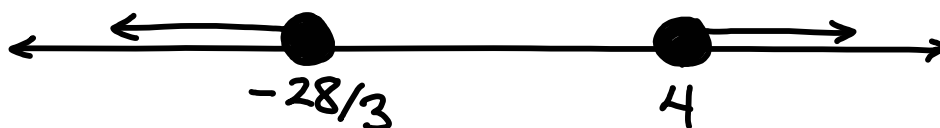
$$-20 \geq 3x + 8 \geq 20$$

$$\begin{array}{ccc} -8 & -8 & -8 \end{array}$$

$$-28 \geq 3x \geq 12$$

$$-28/3 \geq x \geq 4$$

$$x \leq -28/3 \text{ or } x \geq 4$$



18. $\frac{1}{3}|2x + 4| - 6 < 4$

$$\frac{1}{3}|2x + 4| - 6 < 4$$

+6 +6

$$\frac{1}{3}|2x + 4| < 10$$

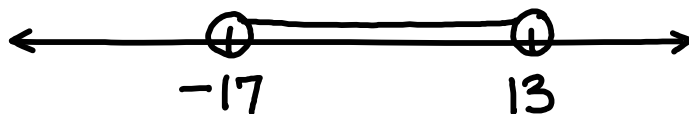
$$|2x + 4| < 30$$

$$-30 < 2x + 4 < 30$$

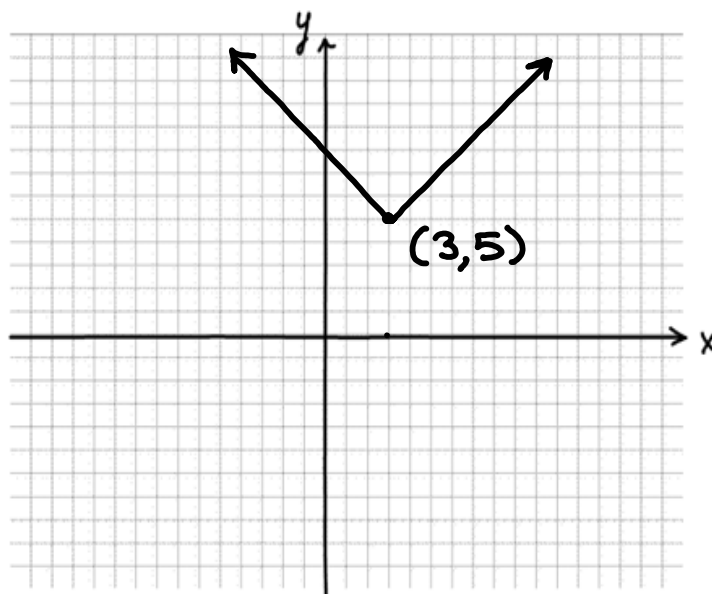
-4 -4 -4

$$-34 < 2x < 26$$

$$-17 < x < 13$$



19. Graph $y = |x - 3| + 5$



20. $y = -|x - 3| + 3$