

1.7: Absolute Values

College Prep

#14 Solve. $|h - 4| = 4$

$$|4| = 4$$

$$|-4| = 4$$

$$h - 4 = 4$$

+4 +4

$$h = 8$$

$$h - 4 = -4$$

+4 +4

$$h = 0$$

Absolute Value Equations

Extraneous Solution: Solution that when plugged into the original equation no longer works.

Always
check!

#28 Solve. $|6 - 3k| = 21$

$$\begin{array}{r} 6 - 3k = 21 \\ -6 \quad -6 \end{array}$$

$$\begin{array}{r} -3k = 15 \\ -3 \quad -3 \end{array}$$

$$k = -5$$

$$\begin{array}{r} 6 - 3k = -21 \\ -6 \quad -6 \end{array}$$

$$\begin{array}{r} -3k = -27 \\ -3 \quad -3 \end{array}$$

$$k = 9$$

#36 Solve. Check for Extraneous solutions.

$$|8x - 1| = 6x$$

$$8x - 1 = 6x$$

$-6x$ $-6x$

$$2x - 1 = 0$$

$+1$ $+1$

$$\frac{2x}{2} = \frac{1}{2}$$

$$x = 0.5$$

$$8x - 1 = -6x$$

$+6x$ $+6x$

$$14x - 1 = 0$$

$+1$ $+1$

$$\frac{14x}{14} = \frac{1}{14}$$

$$x = \frac{1}{14}$$

$$|8x - 1| = 6x$$

$$\boxed{x = 0.5} \checkmark$$

$$|8(0.5) - 1| = 6(0.5)$$

$$|3| = 3$$

$$3 = 3 \checkmark$$

$$\boxed{x = \frac{1}{14}} \checkmark$$

$$|8(\frac{1}{14}) - 1| = 6(\frac{1}{14})$$

$$|-\frac{3}{7}| = \frac{3}{7}$$

$$\frac{3}{7} = \frac{3}{7} \checkmark$$

Ex. 4: Solve. Check for Extraneous solutions.

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

$$-1(x+3)$$

↓

$$\begin{array}{r} 5x - 9 = x + 3 \\ -x \quad \quad -x \end{array}$$

$$\begin{array}{r} 5x - 9 = -x - 3 \\ +x + 9 \quad +x + 9 \end{array}$$

$$\begin{array}{r} 4x - 9 = 3 \\ +9 \quad +9 \end{array}$$

$$\frac{6x}{6} = \frac{6}{6}$$

$$\frac{4x}{4} = \frac{12}{4}$$

$$\boxed{x = 3}$$

$$\boxed{x = 1}$$

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

$$\boxed{x = 3}$$

$$|5(3) - 9| = 3 + 3$$

$$|6| = 6 \quad \checkmark$$

$$\boxed{x = 1}$$

$$|5(1) - 9| = 1 + 3$$

$$|-4| = 4 \quad \checkmark$$

Ex. 5: Solve. Then graph the solution.

$$|4x + 5| > 13$$

flip ↙

$$4x + 5 < -13$$

-5 -5

$$4x + 5 > 13$$

-5 -5

$$\frac{4x}{4} > \frac{8}{4}$$

$$x > 2$$



or

$$\frac{4x}{4} < \frac{-18}{4}$$

$$x < -4.5$$



Ex. 6: Solve. Then graph the solution.

$$|4y - 9| \leq 7$$

$$4y - 9 \leq 7$$

+9 +9

$$\frac{4y}{4} \leq \frac{16}{4}$$

$$y \leq 4$$

$$4y - 9 \geq -7$$

+9 +9

$$\frac{4y}{4} \geq \frac{2}{4}$$

$$y \geq 0.5$$

and

$$0.5 \leq y \leq 4$$

