$|-5|=5$ Algebra 1 2.5 $|(3+-4)|$

$|-1|=1$

$|-13|=13$ Evaluate absolute value expressions

Solve absolute value equations

distance from zero

absolute value

$|5|=5$

activ: floor graphs

$|-3|=3$

1 Absolute Value Expressions

Expressions with absolute values define an upper and lower range in which a value must lie. Expressions involving absolute value can be evaluated using the given value for the variable.

Example 1 Expressions with Absolute Value

Evaluate $|4 + 6| - 14$ if $m = 4$.

$|10| - 14$

$10 + -14 = -4$

GuidedPractice

1. Evaluate $23 - |3 - 4x|$ if $x = 2$.

$23 - |(3 - 8)|$

$23 - |-5|$

$23 - 5 = 18$

KeyConcept Absolute Value Equations

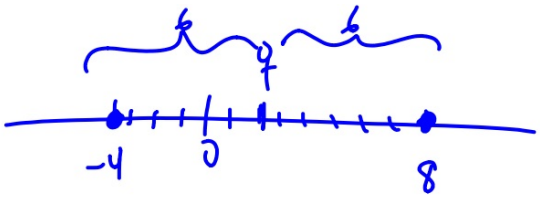
Words When solving equations that involve absolute values, there are two cases to consider.

Case 1 The expression inside the absolute value symbol is positive or zero.

Case 2 The expression inside the absolute value symbol is negative.

Symbols For any real numbers a and b, if $|a| = b$ and $b \geq 0$, then $a = b$ or $a = -b$.

Example $|d| = 10$, so $d = 10$ or $d = -10$.



Whiteboards: practice

$|x-2| = 6$

$\frac{-4+8}{2} = \frac{4}{2} = 2$

$x - 2 = -6$
$+2 \quad +2$
$x = -4$

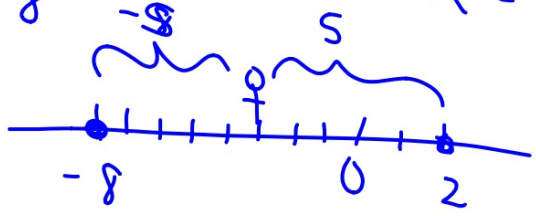
$x - 2 = 6$
$+2 \quad +2$
$x = 8$

$$|x+3| = 5$$

$$x + 3 = -5$$
$$-3 \quad -3$$
$$x = -8$$

$$x + 3 = 5$$
$$-3 \quad -3$$
$$x = 2$$

$$\frac{-8+2}{2} = \frac{-6}{2} = -3$$



Absolute value equations occur in real-world situations that describe a range within which a value must lie.

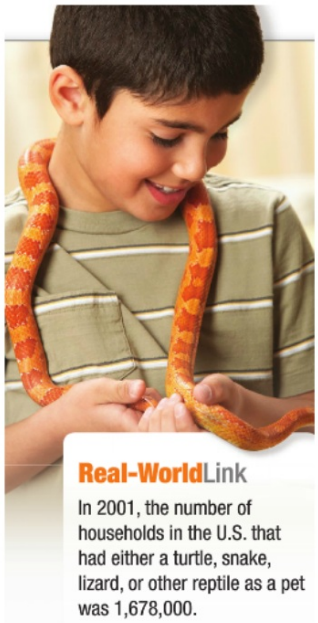
Real-World Example 3 Solve an Absolute Value Equation

SNAKES The temperature of an enclosure for a pet snake should be about 80°F, give or take 5°. Find the maximum and minimum temperatures.

± 5

80 ± 5

$75 - 85$

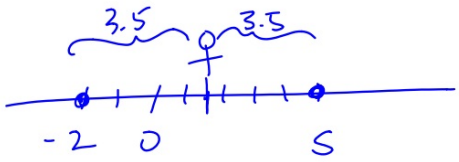


Real-World Link

In 2001, the number of households in the U.S. that had either a turtle, snake, lizard, or other reptile as a pet was 1,678,000.

Solve

$$|2x-3| = 7$$



$$2x - 3 = -7$$
$$+3 \quad +3$$
$$\frac{2x}{2} = \frac{-4}{2}$$
$$x = -2$$

$$2x - 3 = 7$$
$$+3 \quad +3$$
$$\frac{2x}{2} = \frac{10}{2}$$
$$x = 5$$

$$\frac{-2+5}{2} = \frac{3}{2} = 1.5$$