Algebra 1 5.5

Solve and graph absolute value inequalities

inequality

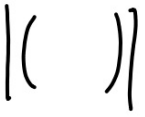
absolute value = distance (pos.)

less than < closer

greater than > farther

number line & distance

whiteboards



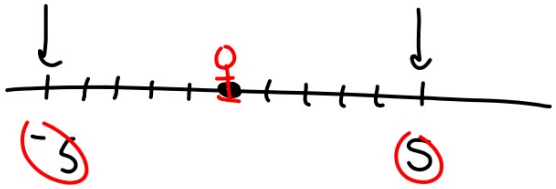
Gr. 6-7 standard

| ???| = 5

$|5| = 5$

$|-5| = 5$

erase neg signs

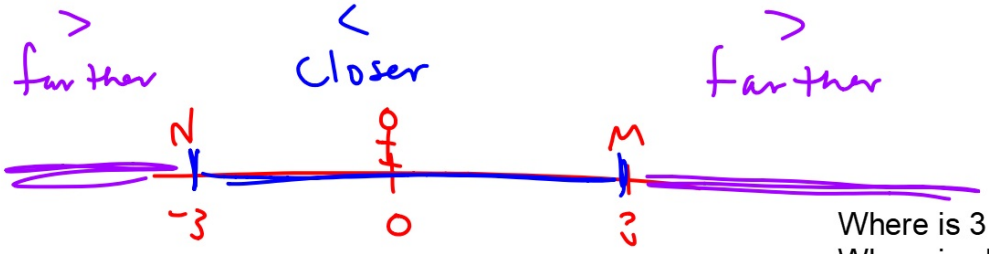


$|7| = 7$

$|-6| = 6$

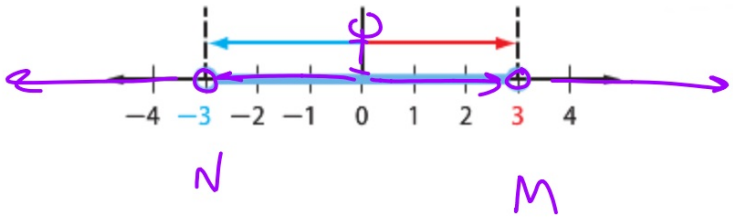
absolute value = distance (from zero)

Number line
stand 3 steps away



Where is 3 away?
Where is closer than 3?
Where is farther than 3?

1 Absolute Value Inequalities (<) The inequality $|x| < 3$ means that the distance between x and 0 is less than 3.



| |=5

| |=8

| |=13

| |= -2

Exa 1 Solve Absolute Value Inequalities (<)

Solve each inequality. Then graph the solution set.

a. $|m + 2| < 11$

< = closer

Distance = 11

> = farther

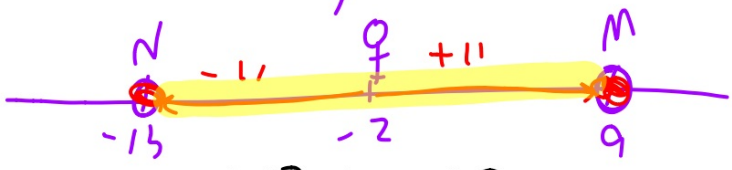
guidepost

What might have been inside the | | originally?
Find each end =
Is the distance less or more?
Where is the middle?

$m + 2 = -11$
$-2 \quad -2$
$m = -13$

$m + 2 = 11$
$-2 \quad -2$
$m = 9$

$\frac{(-13 + 9)}{2}$
$\frac{-4}{2}$
-2



$-13 < m < 9$

Guic ctice

1A. $|n - 8| \leq 2$

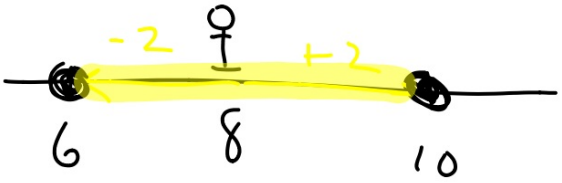
What could have been inside?
Find each end
Is the distance less or more?
What is in the middle?

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

$\therefore$

$n - 8 = 2$
$+8 \quad +8$
$n = 10$

$\frac{6+10}{2} = \frac{16}{2}$



$6 \leq n \leq 10$

b. | | | −2

N S

What could have been inside? :(
Find each end
Is the distance less or more?
What is in the middle?

Real-World Example 2 Apply Absolute Value Inequalities

INTERNET A recent survey showed that 65% of young adults watched online video clips. The margin of error was within 3 percentage points. Find the range of young adults who use video sharing sites.

62 $\xleftarrow{-3}$ 65 $\xrightarrow{+3}$ 68

$|x - 65| = 3$

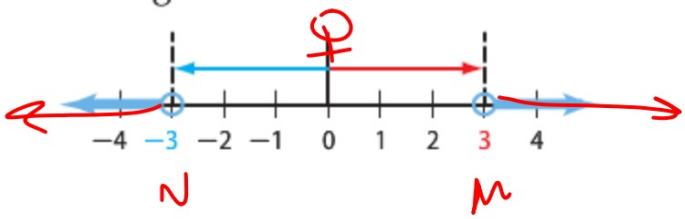
GuidedPractice

2. CHEMISTRY The melting point of ice is 0°C. During a chemistry experiment, Jill observed ice melting within 2°C of this measurement. Write the range of temperatures that Jill observed.

$-2 \leftarrow 0 \rightarrow 2$

$|x-0| = 2$

2 Absolute Value Inequalities (>) The inequality $|x| > 3$ means that the distance between x and 0 is greater than 3.



Example ve Absolute Value Inequalities (>)

Solve $|3n + 6| \geq 12$. Then graph the solution set.

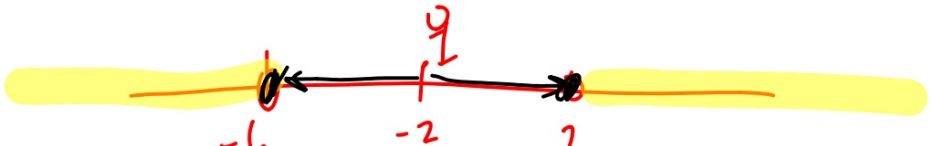
What could have been inside?
Find each end
Is the distance less or more?
What is in the middle?

distance = 12

$3n + 6 = -12$
$-6 \quad -6$
$\frac{3n}{3} = \frac{-18}{3}$
$n = -6$

$3n + 6 = 12$
$-6 \quad -6$
$\frac{3n}{3} = \frac{6}{3}$
$n = 2$

$\frac{-6+2}{2} = \frac{-4}{2}$



$n \leq -6$ or $n \geq 2$

Solve each inequality. Then graph

3A. $|\square| \square 7$

What could have been inside?
Find each end
Is the distance less or more?
What is in the middle?

3B. $|\square| - 5$

What could have been inside? :(
Find each end
Is the distance less or more?
What is in the middle?