Algebra 1
Lesson 1-5 & 1-6

Common Core
Computation with Real Numbers

---

1 block   **1 block**

You walk directly east from your house one block. How far from your house are you?

You walk directly west from your house one block. How far from your house are you?

It didn't matter which direction you walked, you were still 1 block from your house.
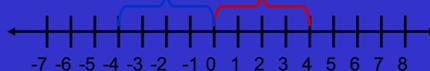
This is like *absolute value*. It is the distance from zero. It doesn't matter whether we are in the positive direction or the negative direction, we just care about how far away we are.

$$|4| = 4$$

4 units away from 0   4 units away from 0

$$|4| = 4$$

-7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

One Way to Add Integers Is With a Number Line

When the number is positive count to the right.
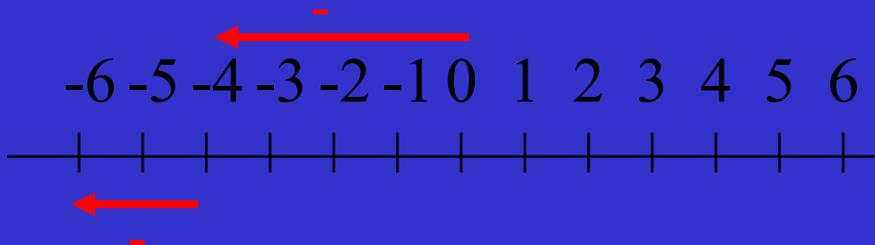When the number is negative count to the left.

-        +

-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

One Way to Add Integers Is With a Number Line

3 + 2 = 5
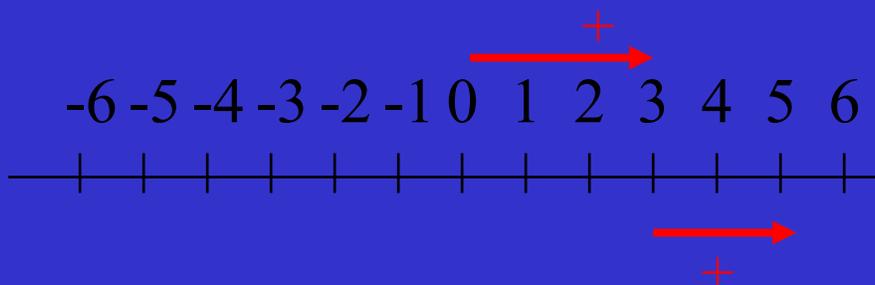
+

-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

+

2

One Way to Add Integers Is With a Number Line

-4 + -2 = -6

-

-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

-

One Way to Add Integers Is With a Number Line

-3 + +7 = +4

-

-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

+

One Way to Add Integers Is With a Number Line

$+3 + -7 = -4$

-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6
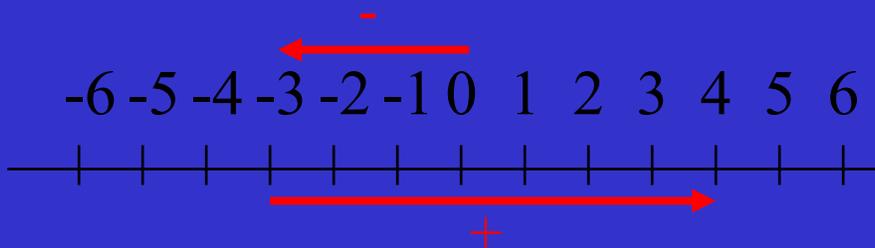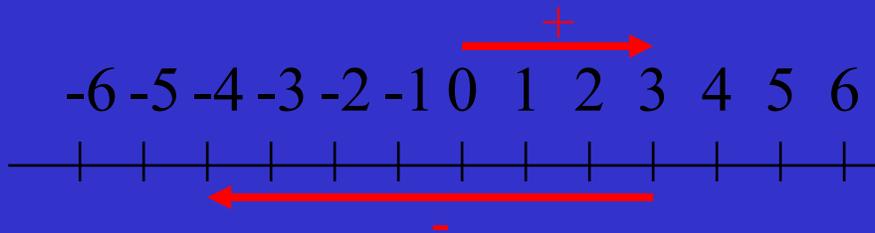
The Rules for **adding** integers:

1. If the numbers have the **same** signs, **add** their absolute values and **keep** that sign.

2. If they have **different** signs, take the **difference** of their absolute values and use the sign of the **larger number**.

What do you call two numbers that are the same distance away from zero on a number line?

-5   **5**

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

Opposites

-5 is the opposite of 5
7 is the opposite of -7

A number and its opposites are called additive inverses. For example, -5 & 5 are additive inverses.

Inverse Property of Addition

Any number added to its opposite is ?????

Zero 0

Examples: **-2 + 2 = 0**

4 + -4 = 0

Subtracting Rules

Change the problem to an addition problem by

Adding its Opposite

and then follow the addition rules.

Lesson 1-5, Problem 4

A reef explorer dives 25 feet to photograph brain coral and then rises 16 feet to travel over a ridge before diving 47 feet to survey the base of the reef. Then the diver rises 29 feet to see an underwater cavern. What is the location of the cavern in relation to sea level?

-27 feet

Multiplying and Dividing Integers

Count the number of negative signs you have in your problem:

- If you have an _even_ number of negative signs in the problem, the answer is positive.

- If you have an **odd** number of negative signs in the problem, the answer is negative.

Look at these examples again from Lesson 1-3…

$$\sqrt{25} = 5$$ OR $$\sqrt{25} = 5$$

5   5   -5   -5

What is a negative number multiplied by another negative number?   A positive

So…how many answers are there to every square root problem? Why?

Non-Real Numbers

$$\sqrt{-4}$$

$$\sqrt{-16}$$

$$\sqrt{-25}$$

$$\sqrt{-36}$$

$$\sqrt{-100}$$

What is difference about these examples?

Look at these examples again…

$$\sqrt{25} = 5$$ OR $$\sqrt{25} = 5$$

5   5   -5   -5

What is a negative number multiplied by another negative number?   A positive

Therefore, you will always have a positive number under your radical sign.

3 [Kinds of Square Roo]ts

Principal
-all #s

Nega
-negati
out

Both Squar
-both the nega
positive signs ar used

$$= \pm 8$$

When you first learned about square roots. You only learned about principle square roots. Now that you know your Integer Rules and more about square roots…you know that ALL square roots have 2 answers!

---

3 Kinds of Square Roots

Principal **Square Root:**

The number that is multiplied by itself is a **positive** number

Example:

$$\sqrt{64} = 8$$

You typically do not add the positive sign in front of the problem and answer. The positive is implied!

3 Kinds of Square Roots

Negative **Square Root:**

The number that is multiplied by itself is a **negative** number (Remember: a negative times a negative is a positive)

Example:

$$-\sqrt{64} = -8$$

The negative sign appears outside the radical sign. So your answer must have a negative sign too!

3 Kinds of Square Roots

Both **Square Roots:**

The number that is multiplied by itself could be BOTH a **negative & positive number**

Example:

$$\pm\sqrt{64} = \pm 8$$

The negative sign and positive signs appear outside the radical sign. So your answer must have BOTH signs!

Find each square root.
If necessary, round to the nearest hundredth.

1. $\sqrt{49}$ **7**

2. $-\sqrt{64}$ **-8**

3. $\pm\sqrt{121}$ **±11**

4. $\sqrt{\dfrac{1}{36}}$ **$\dfrac{1}{6}$**

Lesson 1-6, Problem 4

A sky diver's elevation changes by -3600 feet in 4 minutes after the parachute opens. What is the average change in the sky diver's elevation each minute?

-900 feet per minute

The reciprocal of $\dfrac{a}{b}$ is $\dfrac{b}{a}$

where a and b $\neq$ 0.

The reciprocal of a number is called its multiplicative inverse.

A number multiplied by its reciprocal/multiplicative inverse is ALWAYS equal to what?

1

Example #1

The reciprocal of $\dfrac{2}{7}$ is $\dfrac{7}{2}$.

$$\dfrac{\cancel{2}}{\cancel{7}} \cdot \dfrac{\cancel{7}}{\cancel{2}} = \dfrac{1}{1} = 1$$

Example #2

The reciprocal of -3 is $-\dfrac{1}{3}$.

$$-\dfrac{\cancel{3}}{\cancel{1}} \cdot \dfrac{\cancel{1}}{\cancel{3}} = \dfrac{1}{1} = 1$$

12

Basically, you are flipping the fraction!

We will use the multiplicative inverses
for dividing fractions.

What is ¾ ÷ (5/2)?

Is ¾ ÷ (-5/2) equivalent to –(3/4 ÷ 5/2)?
Explain.