Math 10 Lecture Videos

Section 1.5
Addition of Real Numbers

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OBJECTIVES:

1. Add numbers with a number line.
2. Find sums using identity and inverse properties.
3. Add numbers without a number line.
4. Use addition rules to simplify algebraic expressions.
5. Solve applied problems using a series of additions.

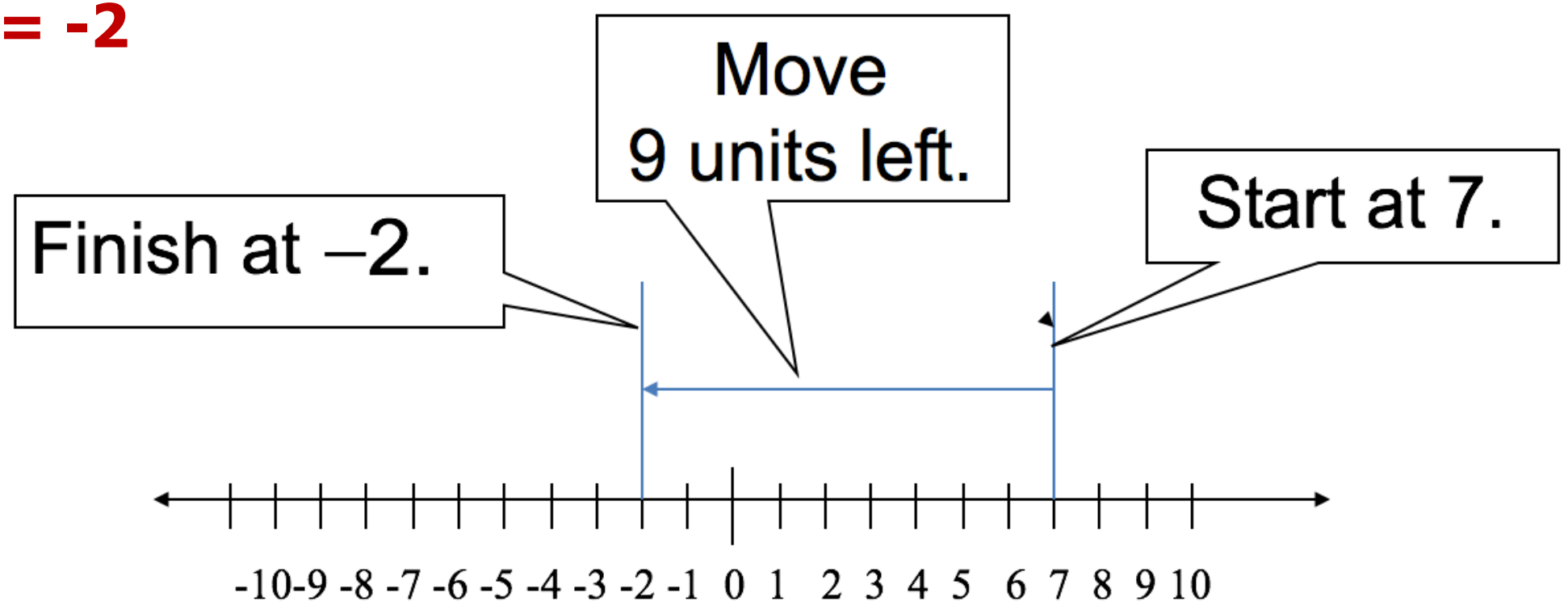
Objective 1:
Add a number with a number line

Using the Number Line to Find a Sum
Let a and b represent real numbers. To find a + b using the number line:
1. Start with *a*.
2. **a.** If *b* is **positive**, move b units to the **right**. **b.** If *b* is **negative**, move /b/ units to the **left**. **c.** If *b* is **0**, **stay** at *a*.
3. The number where we finish on the number line represents the sum of a and b.

Objective 1:
Add a number with a number line

Add 7 + (-9) using the number line

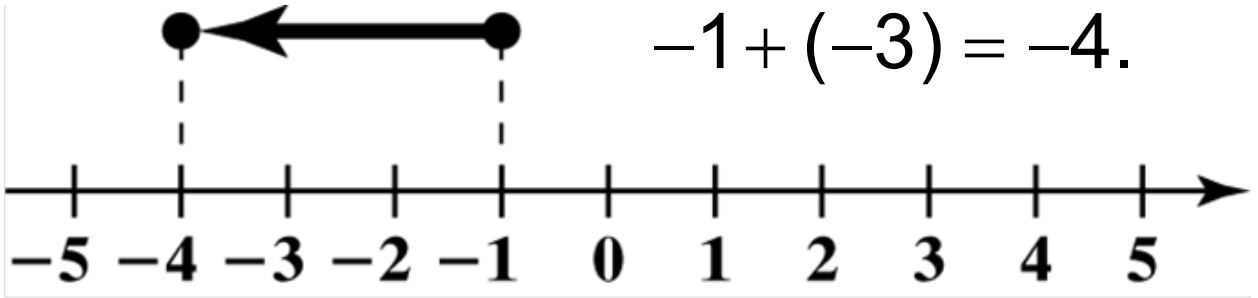
7 + (-9) = -2



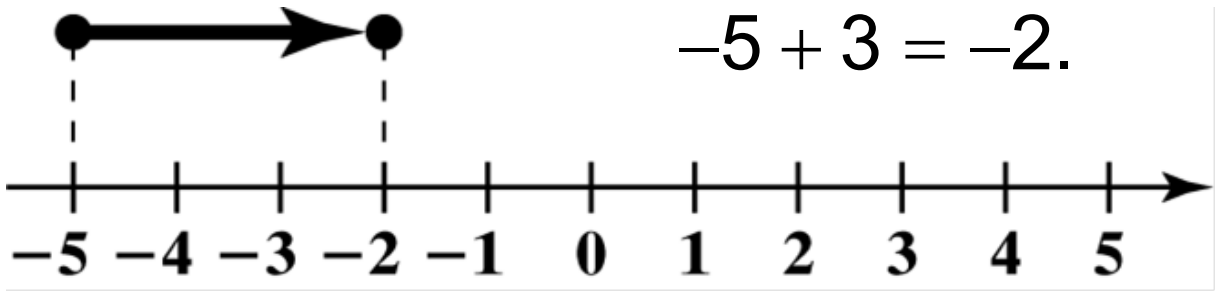
Objective 1:
Add a number with a number line

Here are more examples!

-1 + (-3)



-5 + 3



Objective 2: Find Sums Using Identity and Inverse Properties

Let *a* represent a real number, a variable or algebraic expression.

Property	Meaning	Examples
Identity Property of Addition	Zero can be deleted from a sum. $a + 0 = a$ $0 + a = a$	$7 + 0 = 7$ $0 + 2x = 2x$ $-3y + 0 = -3y$

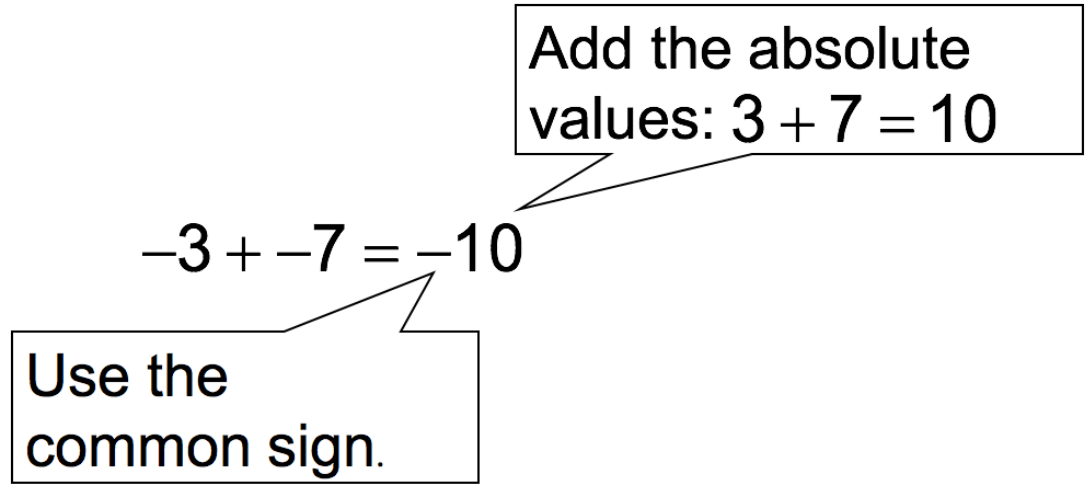
Objective 2: Find Sums Using Identity and Inverse Properties

Let *a* represent a real number, a variable or algebraic expression.

Property	Meaning	Examples
Inverse Property of Addition	The sum of a real number and its additive inverse gives 0, the additive identity. $a + (-a) = 0$ $(-a) + a = 0$	$5 + (-5) = 0$ $6x + (-6x) = 0$ $(-2y) + 2y = 0$

Objective 3:
Add Numbers without a Number Line

Adding Two Numbers with the Same Sign
1. Add the absolute values.
2. Use the common sign as the sign of the sum.



Objective 3:
Add Numbers without a Number Line

Adding Two Numbers with Different Signs
1. Subtract the smaller absolute value from the greater absolute value.
2. Use the sign of the number with the greater absolute value as the sign of the sum.

$-13 + 7 = -6$

Subtract the absolute values: $13 - 7 = 6$

Use the sign of the number with the greater absolute value.

Objective 3:
Add Numbers without a Number Line

Add without using a number line: $-\frac{2}{3}+\left(-\frac{1}{6}\right)$

$$-\frac{2}{3}+\left(-\frac{1}{6}\right)=-\frac{4}{6}+\left(-\frac{1}{6}\right)$$

$$=-\frac{5}{6}$$

Add without using a number line: $-0.4+1.6$

$$-0.4+1.6=1.2$$

Objective 4: Use Addition Rules to Simplify Algebraic Expressions

Simplify the following:

1. $-20x + 3x = (-20 + 3)x$
   $= -17x$

2. $3y + (-10z) + (-10y) + 16z = 3y + (-10z) + (-10y) + 16z$
   $= 3y + (-10y) + (-10z) + 16z$
   $= (3 - 10)y + (-10 + 16)z$
   $= -7y + 6z$

Objective 5: Solve applied problems using a series of additions.

One way to add a series of positive and negative numbers is to use the commutative and associative properties.

1. Add all the positive numbers.
2. Add all the negative numbers.
3. Add the sums obtained in the first two steps.

Objective 5: Solve applied problems using a series of additions.

The water level of a reservoir is measured over a five-month period. During this time, the level rose 2 feet, then fell 4 feet, then rose 1 foot, then fell 5 feet, and then rose 3 feet. What was the change in the water level at the end of the five months?

The level rose 2 feet: +2
Then fell 4 feet: -4
Then rose 1 foot: +1
Then fell 5 feet: -5
And then rose 3 feet: +3

$$2+(-4)+1+(-5)+3=(2+1+3)+[(-4)+(-5)]$$
$$=6+(-9)$$
$$=-3$$

OBJECTIVES:

- Add numbers with a number line. ✓
- Find sums using identity and inverse properties. ✓
- Add numbers without a number line. ✓
- Use addition rules to simplify algebraic expressions. ✓
- Solve applied problems using a series of additions. ✓