Integers and Graphing

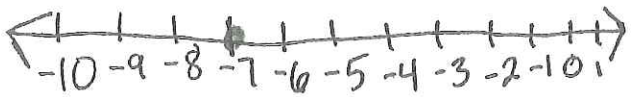
Objective: To use integers to represent real-world situations.

Write an integer for each situation. Explain the meaning of zero in each situation.

Ex. A 10-yard loss.
-10. In football, the integer 0 represents no yards lost or gained.

Ex. 4 inches of rain above normal.
+4. In this situation the integer 0 represents the normal amount of rain.

Ex. Graph -7 on a number line.



Ex. Graph the set of integers $\{-4, 2, -1\}$ on a number line.

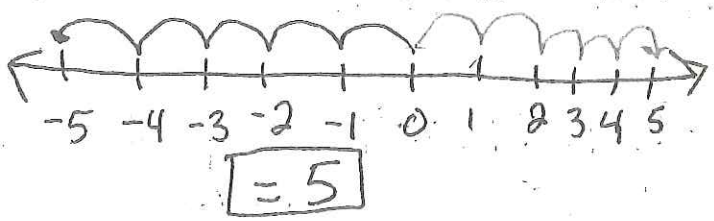
Absolute Value

Objective: To find the absolute value of an integer.

- Absolute value: The distance between a number and zero on the number line.

Ex. 1 Find the opposite of -5.

Method 1: Use a number line.

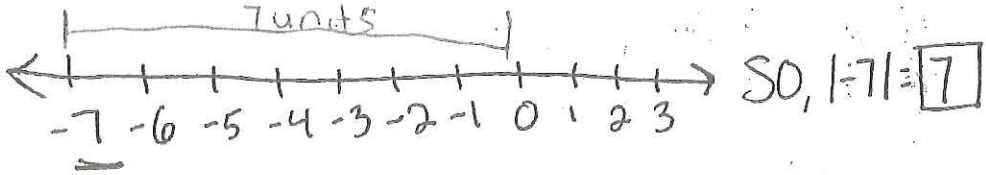


= 5

Method 2: Use symbols.

The integer -5 uses the negative symbol. The opposite of the negative symbol is a positive symbol.
So the opposite of -5 is +5.

Ex. 2 Evaluate $|-7|$ ← Absolute value



So, $|-7| = 7$

Ex. 3. Evaluate $|5| + |-6|$.

1. Find Absolute value
2. Solve.

$5 + 6$

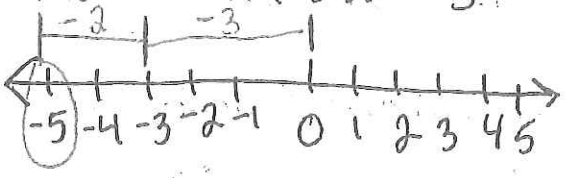
$= 11$

Lesson 3.2 Add Integers

Objective: To add integers

Same Sign: 1. Add the absolute values of the numbers.
2. Keep the common sign.

Ex. Find $-3 + (-2) = -5$



Ex. Find $-26 + (-17) = -43$ keep the common sign.

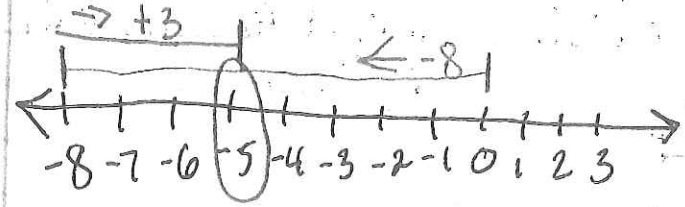
Absolute value → $26 + 17$

Different Signs: 1. Subtract the absolute values of the numbers.
2. Take the sign of the greater absolute value.

Ex. Find $5 + (-3)$. Use counters to model.

$= 2$

Ex. Find $-8 + 3$. Use a number line.



$= -5$

Ex. Find $-3 + 2$.

Absolute value: $3 - 2 = 1$ } Keep sign of larger #.

Lesson 3.3 Subtracting Integers.

Objective: to subtract integers.

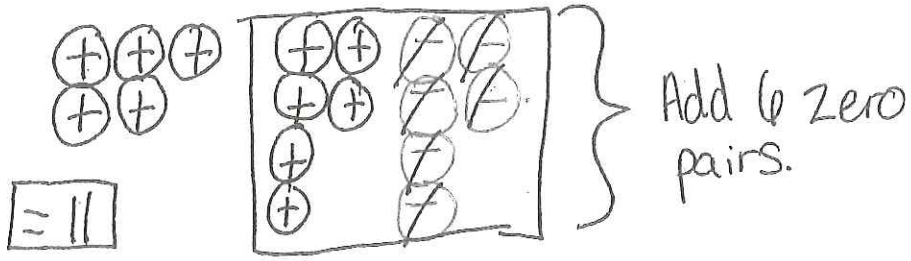
Keep → The first integer the same.

Change → The subtraction operation to addition.

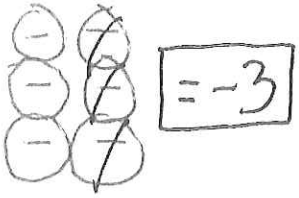
Change → The second integer to its inverse (opposite)

* Follow the addition rules *

Ex. Find $5-(-6)$. Use counters.



Ex. Find $-6-(-3)$. Use counters.



Ex. Find $1-(-2)$

$1+2=\boxed{3}$

Ex. Find $-10-(-7)$

$-10+7=\boxed{-3}$

Ex. Evaluate $x-y$ if $x=-6$ and $y=-5$.

$-6-(-5)$

$-6+5=\boxed{-1}$

Lesson 3.4 Multiply Integers

Objective: To multiply integers.

Different signs: The product of two integers with different signs is negative.

Ex. Find $3(-5) = \boxed{-15}$

Same Signs: The product of two integers with the same signs is positive.

Ex. Find $(-4^2) = (-4)(-4) = \boxed{16}$

Ex. Find $-3(-4)(-2)$

$12(-2) = \boxed{-24}$

Ex. A submersible is diving from the surface at a rate of 90 ft per minute. What is the depth of the sub after 7 minutes?

$-90(7) = -630$ ft

$-630 + 150 = \boxed{-480}$

Lesson 3.5 Divide Integers

Objective: To divide integers.

Divide Integers with Different signs: The quotient of two integers with different signs is negative.

Ex. Find $\frac{-55}{11} = \boxed{-5}$

Ex. Use the table to find the constant rate of change in cm per hour.

The height decreases by 2cm each hour.

Time (h)	Height (cm)
1	10
+1 → 2	8 (−2)
+1 → 3	6 (−2)
+1 → 4	4 (−2)

$\frac{\text{Change in height}}{\text{Change in hours}} = \frac{-2}{1}$

$= -2$. So, the constant rate of change is −2cm per hour.

Divide integers with Same Signs: The quotient of two integers with the same sign is positive.

Ex. Evaluate $-16 \div x$ if $x = -4$.

$$-16 \div (-4) = \boxed{4}$$

Ex. One year, the estimated Australian koala population was 1,000,000. After 10 years, there were about 100,000 koalas. Find the average change in the koala population per year. Then explain the meaning.

N = the new population. P = the original population.

$$\frac{N-P}{10} = \frac{100{,}000 - 1{,}000{,}000}{10}$$

keep, change change.

$$\frac{100{,}000 + (-1{,}000{,}000)}{10} = \frac{-900{,}000}{10}$$

$= -90{,}000$. The koala population has changed by -90,000 per year.