

## Lesson 2.2 Subtracting Integers (Day 2)

### Objective

- Subtract integers by adding the opposite when solving problems that have more than 2 integers AND distance problems.
  
- **Common Core State Standards** 7.NS.1
- **Mathematical Practices** 2. Reason 4. Model mathematics. 5. Use tools strategically. 6. Attend to precision. 7. Look for and use structures

# Lesson 2.2 Subtracting Integers

Quick Write-

What strategy can you use to solve the following problem?

$$-6 - (-10) =$$

Be sure to explain your thinking during each step

# Lesson 2.2 Subtracting Integers

## Practice 2.2

Evaluate each expression.

1  $7 - 18$

2  $20 - 30$

3  $53 - 109$

4  $45 - (-16)$

5  $-7 - (-5)$

6  $-94 - (-68)$

7  $-6 - 8 - 12$

8  $-23 - 17 - 7$

9  $-8 - (-4) - 5$

10  $-5 - (-10) - 6$

11  $-20 - (-16) - (-7)$

12  $-11 - (-8) - (-14)$

Think-Pair- Share

\*Can the strategy of Keep-Change-Change be used with subtracting three integers?

# Lesson 2.2 Subtracting Integers

7  $-6 - 8 - 12$

8  $-23 - 17 - 7$

9  $-8 - (-4) - 5$

10  $-5 - (-10) - 6$

11  $-20 - (-16) - (-7)$

12  $-11 - (-8) - (-14)$

Remember from yesterday...

\*Keep the first integer and sign

\*Change the operation of subtraction to addition

\*Change the second integer and sign

# Lesson 2.2 Subtracting Integers

7  $-6 - 8 - 12$

8  $-23 - 17 - 7$

9  $-8 - (-4) - 5$

10  $-5 - (-10) - 6$

11  $-20 - (-16) - (-7)$

12  $-11 - (-8) - (-14)$

7  $-6 - 8 - 12 = -26$

8  $-23 - 17 - 7 = -47$

9  $-8 - (-4) - 5 = -9$

10  $-5 - (-10) - 6 = -1$

11  $-20 - (-16) - (-7) = 3$

12  $-11 - (-8) - (-14) = 11$

Remember from yesterday...

\*Keep the first integer and sign

\*Change the operation of subtraction to addition

\*Change the second integer and sign

# Lesson 2.2 Subtracting Integers

**Find the distance between two integers.**

**a)** Find the distance between 2 and  $-6$ .

# Lesson 2.2 Subtracting Integers

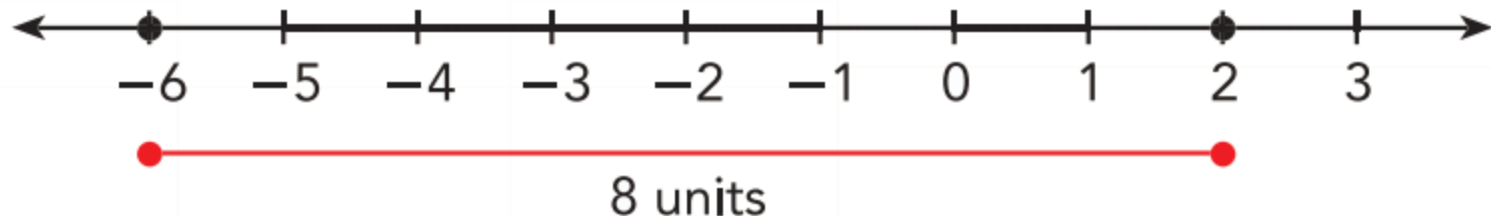
Find the distance between two integers.

a) Find the distance between 2 and  $-6$ .

**Solution**

*Method 1*

Use a number line to plot the points and count the units.



The distance between 2 and  $-6$  is 8 units.

# Lesson 2.2 Subtracting Integers

**Find the distance between two integers.**

**a)** Find the distance between 2 and  $-6$ .

## *Method 2*

Use absolute value to find the distance between integers with different signs.

Distance between 2 and  $-6$ :

$$\begin{aligned} |2 - (-6)| &= |2 + 6| \\ &= 8 \end{aligned}$$

Rewrite subtraction as adding the opposite.

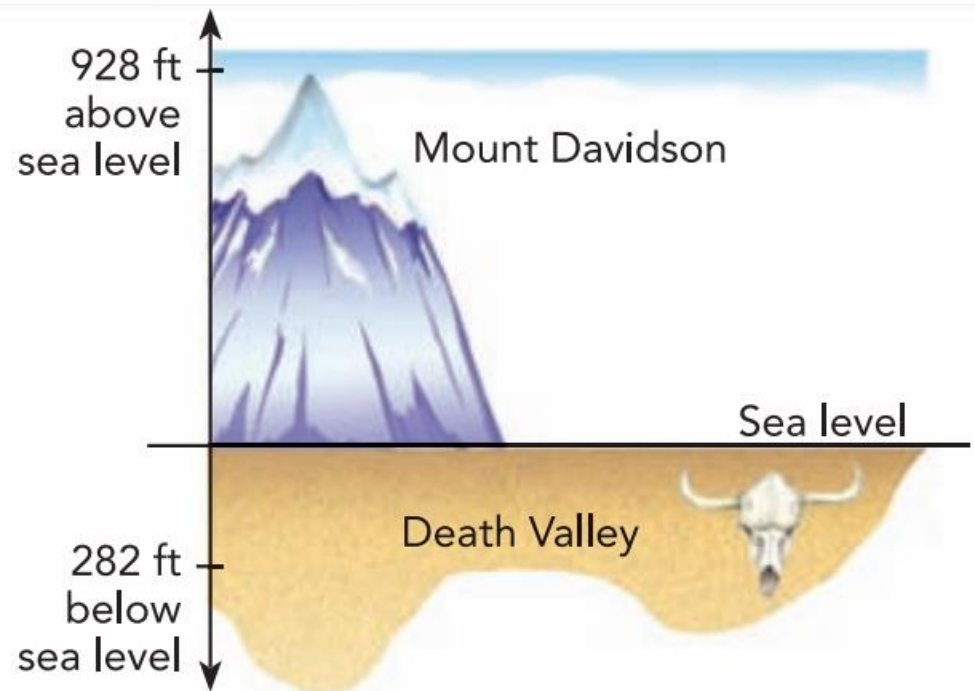
Add.

The distance between 2 and  $-6$  is 8 units.



# Lesson 2.2 Subtracting Integers

- b) Determine the difference in elevation between Death Valley, California, 282 feet below sea level, and the summit of California's Mount Davidson, 928 feet above sea level.



# Lesson 2.2 Subtracting Integers

## Solution

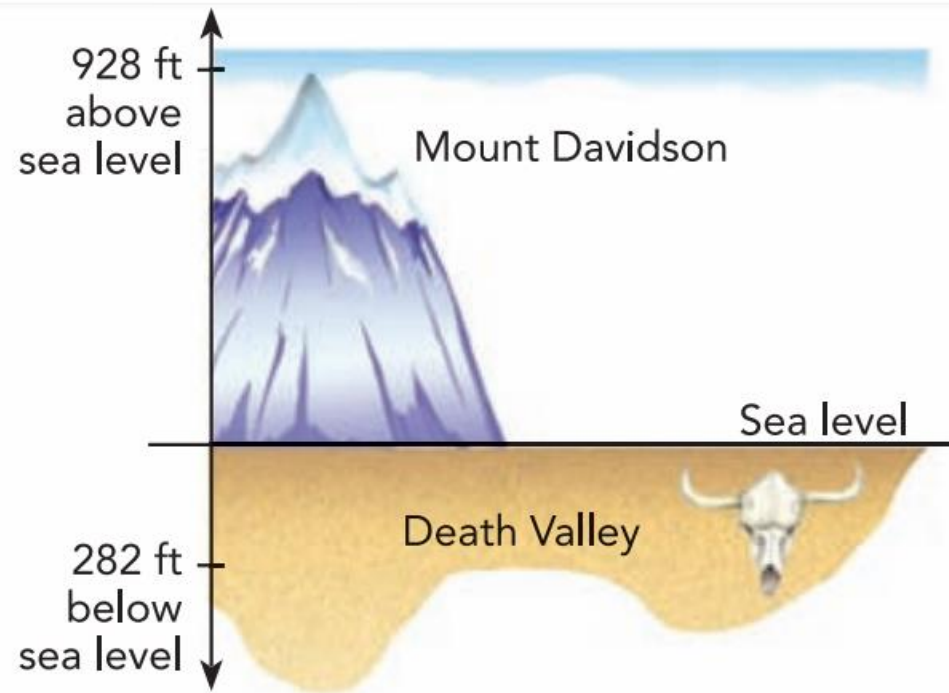
Elevation of Death Valley:  $-282$  ft

Elevation of Mount Davidson:  $928$  ft

Difference between the two elevations:

$$\begin{aligned} |928 - (-282)| &= |928 + 282| \\ &= 1,210 \text{ ft} \end{aligned}$$

The difference in elevation is 1,210 feet.



Rewrite subtraction as adding the opposite.

Add.

# Lesson 2.2 Subtracting Integers

## Your Turn

\*Choose strategy that works for you number line or absolute value

Find the distance between 3 and  $-2$ .

# Lesson 2.2 Subtracting Integers

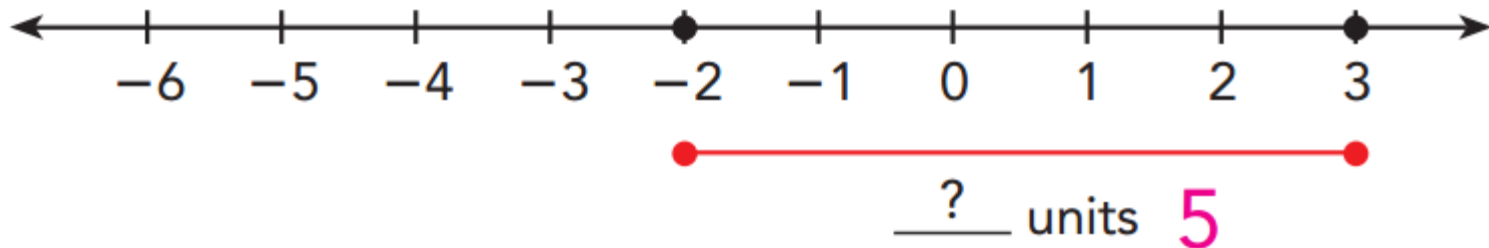
## Your Turn

\*Choose strategy that works for you number line or absolute value

Find the distance between 3 and  $-2$ .

### *Method 1*

Use a number line to plot the points and count the units.



The distance between 3 and  $-2$  is 5 units. 5

# Lesson 2.2 Subtracting Integers

## Your Turn

\*Choose strategy that works for you number line or absolute value

Find the distance between 3 and  $-2$ .

### Method 2

Use absolute value to find the distance between integers with opposite signs.

Distance between 3 and  $-2$ :

$$\begin{aligned} |3 - \underline{\quad?}\quad| &= |\underline{\quad?}\quad| \\ &= \underline{\quad?}\quad \text{units} \end{aligned}$$

Rewrite subtraction as adding the opposite.  $(-2)$ ;  $3 + 2$   
Add. **5**

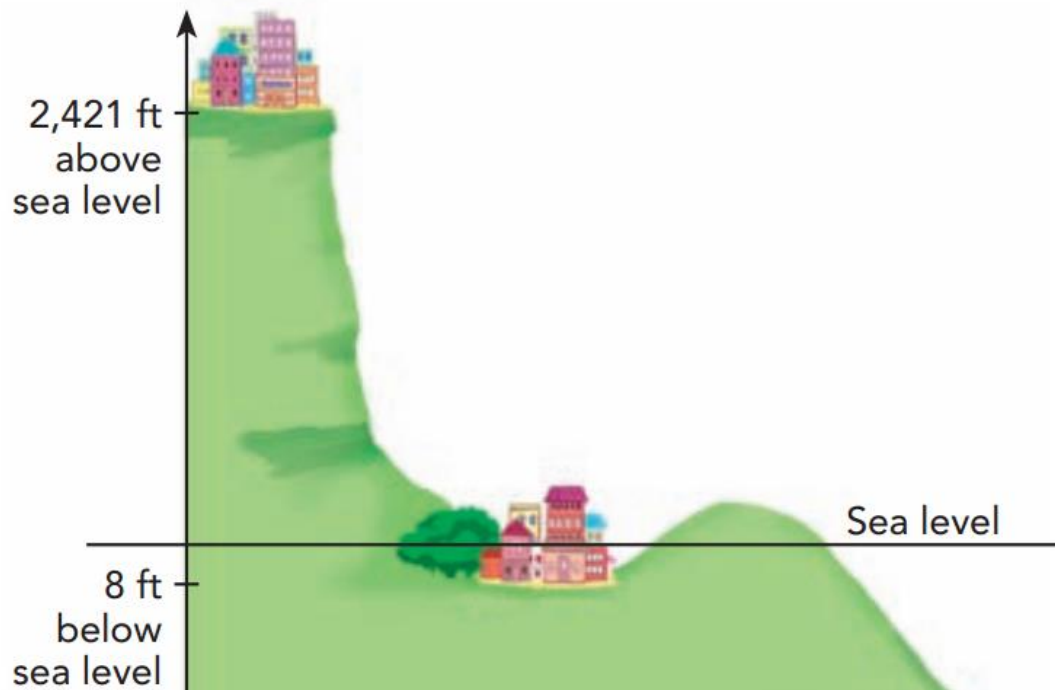
The distance between 3 and  $-2$  is  $\underline{\quad?}\quad$  units.

# Lesson 2.2 Subtracting Integers

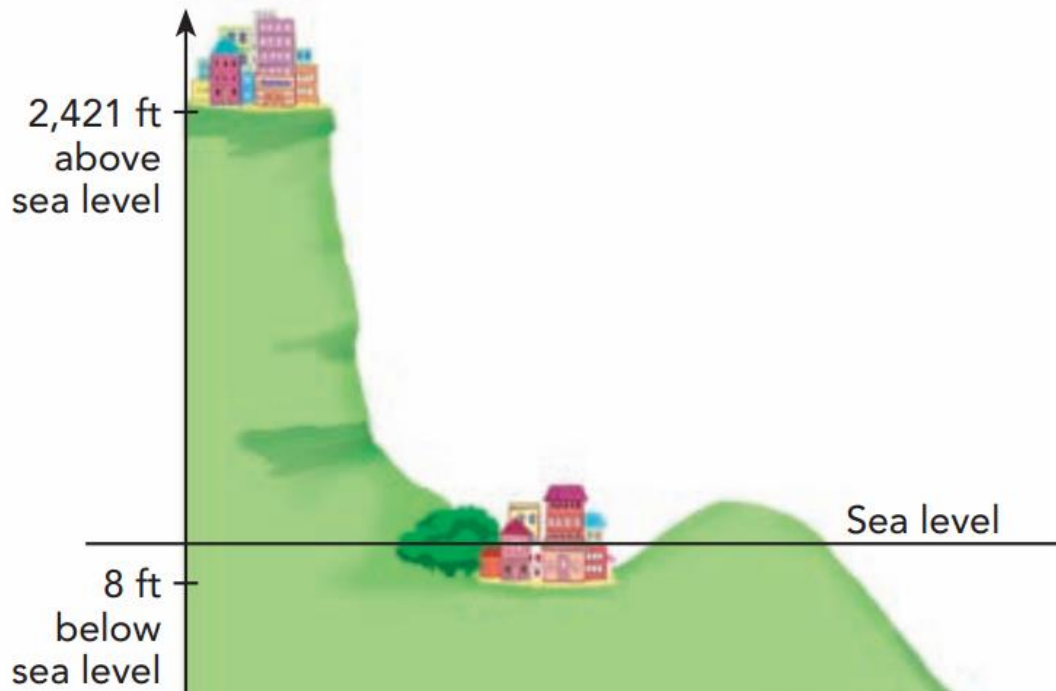
## Your Turn

\*Choose strategy that works for you number line or absolute value

A particular town has an elevation of 8 feet below sea level. Another town on top of a mountain has an elevation of 2,421 feet above sea level. What is the difference in the elevations of the two towns?



# Lesson 2.2 Subtracting Integers



Elevation of town below sea level:    ? ft  $-8$

Elevation of town on top of mountain:    ? ft  $2,421$

Difference between the two elevations:

$$\begin{aligned} | \underline{\quad ?} - \underline{\quad ?} | &= | \underline{\quad ?} | \\ &= \underline{\quad ?} \text{ ft} \end{aligned}$$

Rewrite subtraction as adding the opposite.  $2,421; (-8); 2,421 + 8$   
Add.  $2,429$

The difference in the elevations of the two towns is    ? feet.  $2,429$

# Lesson 2.2 Subtracting Integers

## Independent Practice #13-18 and 23-27

### \*\*\*\*Challenge #28-30\*\*\*\*

Name: \_\_\_\_\_

Course 2

### Practice 2.2

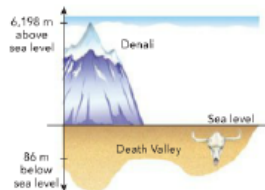
Evaluate the distance between each pair of integers.

- 13 4 and 20      14 16 and 52      15 -15 and 36  
16 -7 and 41      17 -28 and -3      18 -19 and -8

22  **Math Journal** Darren has trouble simplifying  $15 - (-36)$ . Write an explanation to help him.

23 The wind-chill temperature at 10 P.M. was  $-8^{\circ}\text{F}$ . One hour later, the wind-chill temperature had fallen to  $-28^{\circ}\text{F}$ . Write an expression to represent the change in temperature. Then find the change in temperature.

24 The lowest point in North America is in Death Valley, California, which is 86 meters below sea level at its lowest point. The highest point is Denali, a mountain in Alaska, with an elevation of 6,198 meters above sea level. What is the difference in their elevations?



- 25 Belinda has two freezers. Freezer A keeps frozen foods at a temperature of  $-20^{\circ}\text{F}$ , while Freezer B keeps frozen foods at a temperature of  $-4^{\circ}\text{F}$ . She transferred a package of frozen food from one freezer to the other.
- What is the temperature difference between the two freezers?
  - If the temperature of the package rises after the transfer, from which freezer was the package taken?
- 26 You and a friend are playing a video game. Your score so far is 340 points and your friend's score is  $-220$  points. What is the difference between your scores?
- 27 Two record low monthly temperatures for Anchorage, Alaska, are  $-34^{\circ}\text{F}$  in January and  $31^{\circ}\text{F}$  in August. Find the difference between these two temperatures.

## Homework

Course 2 Homework

Evaluate.

- |                   |                   |                  |                  |
|-------------------|-------------------|------------------|------------------|
| 1. $6 - 7$        | 2. $12 - 8$       | 3. $-9 - 9$      | 4. $-17 - 18$    |
| 5. $-13 - (-25)$  | 6. $14 - (-19)$   | 7. $-25 - 15$    | 8. $21 - (-23)$  |
| 9. $-34 - (-11)$  | 10. $56 - 94$     | 11. $38 - (-39)$ | 12. $72 - 27$    |
| 13. $-36 - 47$    | 14. $-33 - (-68)$ | 15. $76 - 18$    | 16. $4 -  -5 $   |
| 17. $ -10  -  7 $ | 18. $ -52  - 49$  | 19. $ -5 - 16 $  | 20. $3 - 9 - 12$ |

## Lesson Check #13

*(can find the distance between two numbers)*