

Pre-Algebra

Essential Question: How can we use integer expressions to solve problems?

Do Now: The ⁺sum of -5 and another integer is a positive integer. $-5 + \boxed{?} = 1$

a) What can you conclude about the sign of the other integer?

The other integer is positive.

b) What can you conclude about the value of the other integer?

The other integer is greater than 5.

Problem Solving with Integers



- 1) Write an integer expression that describes the situation.
- 2) Evaluate the expression.
- 3) Write a sentence to answer the question. (label)

1) A seal is swimming in the ocean 5 feet below sea level. It dives down 12 feet to catch some fish. Then the seal swims 8 feet up towards the surface. What is the seal's final elevation relative to sea level?

$$\begin{array}{r} -5 + (-12) + 8 \\ \hline -17 + 8 \\ \hline -9 \end{array}$$

The seal is 9 feet below sea level.

2) Your checking account is overdrawn by \$50. You deposit \$200 into the account. The following day you use your debit card to purchase an item totaling \$35. What is the current balance in your account?

$$\begin{array}{r} -50 + 200 - 35 \\ \hline 150 - 35 \\ \hline 115 \end{array}$$

The current balance is \$115.

3) The temperature at 6 pm was 8°F. Three hours later the temperature was -11°F. What was the change in temperature?

Think about this first: How would you find the change in temperature if the starting temperature was 15°F and three hours later the temperature was 20°F? $20 - 15 = 5^\circ\text{F}$

$$\begin{array}{r} -11 - 8 \\ \hline -11 + (-8) \end{array}$$

↑ ↑
final - original

Change → -19

Describe → The temperature decreased by 19°F.

- 4) A scientist conducts an experiment in which he records the temperature of a gas that he has heated. The table below shows the initial temperature and the final temperature of the gas.

Initial Temperature	Final Temperature
-21°C	-8°C

- a) Write a difference of integers to find the overall temperature change.

$$\begin{array}{r} -8 - (-21) \\ -8 + 21 \\ \hline 13 \end{array}$$

change \rightarrow 13

describe \rightarrow 13°C increase

- b) Suppose the scientist conducted an experiment in which he cooled the gas. Will the change in temperature be positive or negative? Explain.

Cooling means the temperature decreases. The change will be negative.

- 5) Temperatures in the Gobi Desert reach -40°F in the winter and 90°F in the summer. Find the change in temperature from winter to summer.

$$\begin{array}{r} 90 - (-40) \\ 90 + 40 \\ \hline 130 \end{array}$$

change \rightarrow 130

describe \rightarrow 130°F increase

- 6) A beluga whale is diving downward at a speed of 2 meters per second from sea level. What integer represents the whale's position after 45 seconds? Write and evaluate an expression of integers to represent this situation.

$$\begin{array}{r} -2 \cdot 45 \\ \hline -90 \end{array}$$

90 meters below sea level

- 7) The enrollment at Roslyn Middle School dropped by 128 students over a 4-year period. What is the mean annual drop in enrollment? Write and evaluate an expression of integers to represent this situation. **Helpful Hint: Mean = Average**

$$\begin{array}{r} -128 \div 4 \\ \hline -32 \end{array}$$

The decrease is 32 students per year.

When problem solving, write an expression that describes the situation. Evaluate and express your final answer in the form of a sentence. When finding **change**, subtract the original/initial value from the final value.

Change = final - original

Let's Partner Up



Write and evaluate an integer expression for each situation below. Write a sentence to answer the question.

- 8) Which **continent** has the greater range of elevations? *Hint: Range = High - Low*

	North America	Africa
Highest Elevation	6198 m	5895 m
Lowest Elevation	-86 m	-155 m

$$\begin{array}{r}
 6198 - (-86) \\
 6198 + 86 \\
 6284
 \end{array}
 \qquad
 \begin{array}{r}
 5895 - (-155) \\
 5895 + 155 \\
 6050
 \end{array}$$

North America has the greater range of elevations. $(6284 > 6050)$

- 9) The current temperature is 17°F . If the current temperature is predicted to drop 5°F per hour due to an incoming cold front, determine the temperature in 6 hours.

$$\begin{array}{r}
 17 - 5(6) \\
 17 - 30 \\
 17 + (-30) \\
 -13
 \end{array}$$

-13°F will be the temperature in 6 hours

- 10) An alligator population in a nature preserve in the Everglades decreases by 60 alligators over 5 years. What is the mean yearly change in the alligator population?

$$\begin{array}{r}
 -60 \div 5 \\
 -12
 \end{array}$$

The mean yearly change is a decrease of 12 alligators per year.