

Unit 5 Study Guide: Rational Number Arithmetic

2/3/2020

1.

a. The table show transactions from 5 different bank accounts. Fill in the table with the appropriate values.

$352 + (-48) = 304$

$432 + y = 512$
 $-432 \quad -432$
 $y = 80$

$x + 52 = 12$
 $-52 \quad -52$
 $x = -40$

$x + y = z$	old account balance	transaction amount	new account balance
	352	-48	304
	432	+80	512
	75	-100	-25
	-40	52	12
	-10	-20	-30

$75 + (-100) = -25$

b. Explain what the numbers -10, -20, and -30 tells you about account #5.

Adding 2 negative numbers always gives a negative number.

2. Select all statements that are true.

- a) $7.4 + (-7.4)$ is equal to zero. ✓
- b) $-8.7 + (-9.1)$ is positive. ✗
- c) $-1.6 - (-\frac{12}{4})$ is positive. ✓
- d) $\frac{7}{2} + (-3.5)$ is negative. ✗
- e) $83 - (-245)$ is negative. ✗

(A) $\begin{array}{r} 7.4 \\ -7.4 \\ \hline 0 \end{array}$

(B) $\begin{array}{r} -8.7 \\ +9.1 \\ \hline -17.8 \end{array}$

(C) $\begin{array}{r} \frac{12}{4} = 3 \\ -\frac{3.6}{1} \\ \hline +1.4 \end{array}$

(D) $\begin{array}{r} \frac{7}{2} = 3.5 \\ -3.5 \\ \hline 0 \end{array}$

(E) $\begin{array}{r} -(- \text{ becomes } + \\ +245 \\ 83 \\ \hline +328 \end{array}$

3. Find the missing numbers in these equations.

- a) $(-2) \cdot (-4.5) = ?$ 9
- b) $-8.7 \cdot (-10) = ?$ 87
- c) $(-7) \cdot ? = 14$
- d) $? \cdot (-10) = 90$

(A) $\begin{array}{r} -4.5 \\ \times -2 \\ \hline 9.0 \end{array}$

(B) $\begin{array}{r} -8.7 \\ \times 10 \\ \hline 87.0 \end{array}$

4. Let $x = -\frac{7}{6}$ and $y = -\frac{7}{4}$. Which expression has a negative value?

- a) $x + y$
- b) $x - y$
- c) $x \cdot y$
- d) $\frac{x}{y}$

$-\frac{7}{6} + (-\frac{7}{4})$

$\frac{6}{4} \cdot \frac{12}{12} \cdot \frac{8}{8} \cdot \frac{12}{12}$

$\frac{-14}{12} \cdot \frac{-21}{12} = \frac{-35}{12}$ ← negative answer

5. A ski lodge on the top of a mountain reports that the temperature is currently 3°F and has been falling at a constant rate of 2°F per hour. If it continues to fall at this rate, what will the temperature be in 6 hours?

-2 each hour

$+3$	$3-2$	$1-2$	$-1-2$	$-3-2$	$-5-2$	$-7-2$
1	-1	-3	-5	-7	-9	-9

6. Cindy loaned her friend $\$54$ for a concert ticket. Afterwards, they stopped to get food and she borrowed $\$8$ more. The next day, Cindy's friend paid her $\$20$, how much does she owe Cindy as an integer?

$$\begin{array}{r} -54 \\ -8 \\ \hline -62 \end{array} \qquad \begin{array}{r} -62 \\ +20 \\ \hline -42 \end{array}$$

substitute $-\frac{5}{8}$ for n

7. The value of n is $-\frac{5}{8}$. In which order should these expressions be from least to greatest.

$-\frac{5}{8}$	$1-n$	$n-1$	$-1 \div n$	\rightarrow	$-\frac{5}{8}, \frac{5}{8}, \frac{3}{5}, \frac{5}{8}$
	$1 - (-\frac{5}{8})$	$-\frac{5}{8} - 1$	$-1 \div -\frac{5}{8}$		
	$1 + \frac{5}{8} = \frac{15}{8}$	$-\frac{15}{8}$	$-1 \cdot -\frac{8}{5} = \frac{8}{5}$		

8. A submarine is descending to examine marine life 5,600 feet below the surface. It takes approximately 4 hours to make the entire descent. Write an equation that can be used to represent the relationship between the submarine's elevation, s, and time, t.

every hour, sub drops 1400 feet

$\rightarrow s = -1400t$

$$\begin{array}{r} 1400 \\ 4 \overline{) 5600} \\ \underline{-400} \\ 1600 \\ \underline{-1600} \\ 0 \end{array}$$

9. In Antarctica, the current temperature is -26°F , while the temperature in St. John is 77°F . What is the difference in temperatures between the two cities?

$$-26 - 77 = \begin{array}{r} -26 \\ -77 \\ \hline -103 \end{array}$$

10. A plane is flying 1,950 feet above the ground. An eagle is flying below the plane 150 feet above sea level. Directly below, a school of trout are swimming 35 feet below sea level. Which statements are true.

eagle - plane
 $150 - 1950$

* difference is first number minus second number

- (a) The difference in height between the eagle and the plane is -1800 feet.
- (b) The difference in height between the eagle and the plane is 1800 feet.
- (c) The distance between the heights of the eagle and plane is -1800 feet.
- (d) The difference in heights between the eagle and trout is -185 feet.
- (e) The difference in height between the eagle and the trout is 185 feet.

$$\begin{array}{r} -1950 \\ 150 \\ \hline -1800 \end{array}$$

eagle - trout
 $150 - (-35)$
 $150 + 35 = 185$

11. A large aquarium of water is being filled with a hose. Due to a problem, the sensor does not start working until sometime into the filling process. The sensor initially detects the tank has 225 liters of water in it.

a. The hose fills the aquarium at a constant rate of 15 liters per minute. What will the sensor read at the time of 7 minutes? ↑ Starts

Starts + Add
225 + 105

$225 + 105 = 330 \text{ liters}$

$\begin{matrix} +3 \\ \times 15 \\ \hline 105 \end{matrix}$ ← water added in 7 minutes

b. Later, someone wants to use the data to find the amount of water at times before the sensor started. What should the sensor have read at the time -5 minutes?

$\begin{matrix} +15 \\ \times -5 \\ \hline -75 \end{matrix}$

$225 - 75 = 150 \text{ liters}$

12. Write an equation where a number is subtracted from a variable, and a solution is -8.

$x - 15 = -23$

$\begin{matrix} x - 15 = -23 \\ +15 \quad +15 \\ \hline x = -8 \end{matrix}$

13. Write an equation where a number is multiplied by a variable and the solution (product) is -11/12.

$2x = -\frac{5}{6}$

$\frac{2x}{2} = -\frac{5}{6} \div 2$
 $-\frac{11}{6} \times \frac{1}{2} = -\frac{11}{12}$

14. Match each situation with an equation.

- A 1. A penguin is standing 3 feet above sea level and then dives down 10 feet. +3
- B 2. A dolphin is swimming 3 feet below sea level and then jumps up 10 feet. -10
- F 3. A shark is swimming 10 feet below sea level and then swims up reaching 3 feet below sea level. -10
- C 4. A sea turtle is swimming 3 feet below sea level and then dives down 10 feet. -3
- D 5. An eagle is flying 10 feet above sea level and then dives down to 3 feet above sea level. -10
- E 6. A pelican swimming 10 feet above sea level and then dives down reaching 3 feet below sea level. +10

- a. $3 - 10 = a$
- b. $-3 + 10 = b$
- c. $-3 - 10 = c$
- d. $10 - d = 3$
- e. $10 - e = -3$
- f. $-10 + f = -3$

write + or - above each number to help