

## 2.1 - Adding Rational Numbers

### Vocabulary:

- 
- additive inverse
- matrix

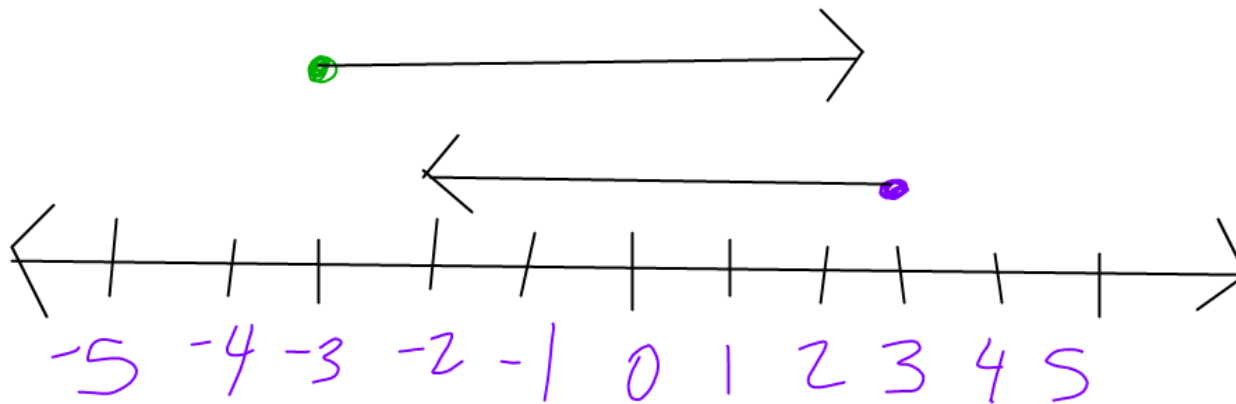
additive inverse	$x - 7 = 10$ $+7$ $+7$ =
opposite of a #	

matrix	$\begin{bmatrix} 2 & 3 \\ 4 & 7 \\ 9 & 11 \end{bmatrix}$ ← row
an arrangement of #'s in columns & rows	↑ column

**1 EXAMPLE** Use a number line to simplify each expression.

a.  $3 + (-5) = -2$

b.  $-3 + 5 = 2$



**2 EXAMPLE** Simplify each expression.

diff. sign

a.  $12 + (-23) = -11$

$$\begin{array}{r} 23 \\ -12 \\ \hline 11 \end{array}$$

same sign

b.  $-6.4 + (-8.6) = -15.0$

$$\begin{array}{r} 6.4 \\ + 8.6 \\ \hline 15.0 \end{array}$$

① which do I have more of?

② how many?

① keep the sign

② add #'s

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$$\# 11. \quad -27 + 19 = \boxed{-8}$$

$$\# 17. \quad \frac{4 \cdot 3}{5 \cdot 3} + \frac{2}{15} = \frac{12}{15} + \frac{2}{15} = \boxed{\frac{14}{15}}$$

$$\# 21. \quad \frac{-2}{3} + \frac{4}{6} = \frac{-4}{6} + \frac{4}{6} = \boxed{0}$$

$$\# 23. \quad -5\frac{7}{12} + 10\frac{3}{4} = 10\frac{9}{12} - 5\frac{7}{12}$$

$$= 5\frac{2}{12}$$

$$= \boxed{5\frac{1}{6}}$$

**3 EXAMPLE** The water level in a lake rose 6 inches and then fell 11 inches.  
Write an addition statement to find the total change in water level.

$$6 + -11 = -5 \text{ inches}$$

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#25. A diver dives 47 ft below the surface of the water and then rises 12 ft.  
Use addition to find the diver's depth.

$$-47 + 12 = -35 \text{ ft.}$$

35 ft. below sea level

**4 EXAMPLE**Evaluate  $3.6 + (-t)$  for  $t = -1.7$ .

$$\begin{array}{r} 1 \\ 3.6 \\ +1.7 \\ \hline 5.3 \end{array}$$

$$3.6 + (-t)$$

$$t = -1.7$$

$$3.6 + (\cancel{-}(-1.7))$$

$$\boxed{5.3}$$

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Evaluate each expression for  $n = 3.5$ 

$$\#29. -5.2 + n \quad -5.2 + 3.5 = \boxed{-1.7}$$

$$\begin{array}{r} 4 \cancel{5.2} \\ -3.5 \\ \hline 1.7 \end{array}$$

#35.  $-9.1 + (-n)$ 

$$-9.1 + (-3.5) = \boxed{-12.6}$$

$$\begin{array}{r} 9.1 \\ 3.5 \\ \hline 12.6 \end{array}$$



OBJECTIVE

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EXAMPLE

A scuba diver who is 88 ft below sea level begins to ascend to the surface. ↑

- a. Write an expression to represent the diver's depth below sea level after rising any number of feet.

$$-88 + x$$

- b. Find the new depth of the scuba diver after rising 37 ft.

$$\begin{array}{r} 88 \\ -37 \\ \hline 51 \end{array}$$

$$-88 + 37 = -51 \text{ ft.}$$

pg. 60 deposit = +  
withdrawal = -

#37. You have \$74 in a checking account. Define a variable and write an expression to find the balance in your account after each deposit or withdrawal below. Then evaluate your expression for each change.

a. a deposit of \$18  $74 + 18 = \$92$

b. a withdrawal of \$29  $74 + (-29) = +\$45$

c. a withdrawal of \$47  $74 + (-47) = \$27$

d. a deposit of \$120  $74 + 120 = \$194$

$$\begin{array}{r} 6\cancel{7}4 \\ -29 \\ \hline 45 \end{array}$$

$$\begin{array}{r} 6\cancel{7}4 \\ -47 \\ \hline 27 \end{array}$$

$$74 + x$$

let  $x =$  deposit or withdrawal

**6 EXAMPLE** Add  $\begin{bmatrix} -6 & 8.6 & 11 \\ 2.3 & 5 & -3 \end{bmatrix} + \begin{bmatrix} 7 & -5.4 & -2 \\ 11.1 & 3 & -1 \end{bmatrix}$

$\rightarrow \begin{bmatrix} -6 & 8.6 & 11 \\ 2.3 & 5 & -3 \end{bmatrix} + \begin{bmatrix} 7 & -5.4 & -2 \\ 11.1 & 3 & -1 \end{bmatrix}$

$$\begin{array}{r} 8.6 \\ -5.4 \\ \hline 3.2 \end{array}$$

$$\begin{bmatrix} 1 & 3.2 & 9 \\ 13.4 & 8 & -4 \end{bmatrix}$$

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simplify:

$$\# 39. \begin{bmatrix} -7.2 \\ 3.2 \\ -4.9 \end{bmatrix} + \begin{bmatrix} -11 \\ 8.4 \\ 24 \end{bmatrix} = \begin{bmatrix} -18.2 \\ 11.6 \\ 19.1 \end{bmatrix}$$

$$\begin{array}{r} 13 \\ 124.10 \\ - 4.9 \\ \hline 19.1 \end{array}$$

## Homework Problems

pg. 60 #43, 45, 51, 61, 62, 67