

Pre-Algebra
Operations with Rational Numbers

Let's work together.



Evaluate each numerical expression.

1. $-12.4 + 9.2$

$$\boxed{-3.2} \quad \begin{array}{r} 12.4 \\ -9.2 \\ \hline 3.2 \end{array}$$

2. $-3 + 1\frac{1}{2} + 2\frac{1}{2}$

$$-3 + 4$$

$$\boxed{1}$$

3. $(-5)(-2.1)$

$$\boxed{10.5} \quad \begin{array}{r} 2.1 \\ \times 5 \\ \hline 10.5 \end{array} \quad \begin{array}{r} 1 \\ +0 \\ \hline 1 \end{array}$$

4. $(\frac{2}{3})(-3\frac{9}{10})(\frac{5}{6})$

$$\frac{\cancel{2}^1}{\cancel{3}_1} \cdot \frac{\cancel{-39}^{-13}}{\cancel{10}_2} \cdot \frac{\cancel{5}^1}{\cancel{6}_2}$$

$$\boxed{-\frac{13}{6} \text{ or } -2\frac{1}{6}}$$

5. $-\frac{2}{9} - (-3)$

$$-\frac{2}{9} + 3$$

$$\boxed{2\frac{7}{9}}$$

6. $\frac{\frac{5}{8}}{\frac{6}{7}}$

$$-\frac{5}{8} \div -\frac{6}{7}$$

$$-\frac{5}{8} \cdot \frac{7}{-6}$$

$$-\frac{35}{48} = \boxed{\frac{35}{48}}$$

7. $1\frac{3}{5} - 2\frac{1}{2}$

$$1\frac{3}{5} + (-2\frac{1}{2})$$

$$(\frac{2}{2})\frac{8}{5} + \frac{-5}{2}(\frac{5}{5})$$

$$\frac{16}{10} + \frac{-25}{10}$$

$$\boxed{-\frac{9}{10}}$$

8. $15 \div -0.03$

$$0.03 \overline{)15.00}$$

$$\begin{array}{r} 500 \\ 3 \overline{)1500} \\ \underline{-15} \\ 0 \end{array}$$

$$\boxed{-500}$$

9. $5 - 7.5 + \frac{3}{4} - (-1.25)$

$$5 + (-7.5) + \underline{0.75 + 1.25}$$

$$5 + (-7.5) + 2$$

$$7 + (-7.5)$$

$$-0.5$$

Problem Solving with Rational Numbers

Write an evaluate numerical expressions that represent the situations below.

10. Sandy has \$200 in her bank account.

- a. If she writes 6 checks for exactly \$19.98, write a numerical expression that represents the *change* in her bank account.

$$\begin{aligned} & -19.98 \times 6 \\ & - \$119.88 \end{aligned}$$

$$\begin{array}{r} 19.98 \\ \times 6 \\ \hline 119.88 \end{array}$$

- b. What is her account balance after the checks are cashed?

$$\begin{aligned} & 200 - 119.88 \\ & \$80.12 \end{aligned}$$

$$\begin{array}{r} 200.00 \\ - 119.88 \\ \hline 80.12 \end{array}$$

11. On Monday, your bank account balance was -\$12.58. You didn't realize this and wrote a check for \$30.72 for groceries.

- a. What is the new balance in your checking account?

$$\begin{aligned} & -12.58 - 30.72 \\ & -12.58 + (-30.72) \\ & - \$43.30 \end{aligned}$$

$$\begin{array}{r} 12.58 \\ + 30.72 \\ \hline 43.30 \end{array}$$

- b. The bank charges a \$25 fee for paying a check on a negative balance. What is the balance in your checking account after this fee?

$$\begin{aligned} & -43.30 - 25 \\ & -43.30 + (-25) \\ & - \$68.30 \end{aligned}$$

$$\begin{array}{r} 43.30 \\ + 25.00 \\ \hline 68.30 \end{array}$$

- c. How much money do you need to deposit to bring your account balance back up to \$0 after the fee?

$$\$68.30$$

12. A water pail in your backyard has a small hole in it. You notice that it has drained a total of 3.5 liters in 4 days. What is the average change in water volume each day?

$$\begin{aligned} & -3.5 \div 4 \\ & -0.875 \end{aligned}$$

$$\begin{array}{r} 0.875 \\ 4 \overline{) 3.500} \\ \underline{-32} \\ 30 \\ \underline{-28} \\ 20 \\ \underline{-20} \\ 0 \end{array}$$

The pail drains .875 liters per day.

13. A car travels 30 miles in $\frac{2}{3}$ of an hour. What is the average speed, in miles per hour?

$$\begin{aligned} & 30 \div \frac{2}{3} \\ & \overset{15}{\cancel{30}} \cdot \frac{3}{\cancel{2}} \\ & 45 \text{ mph} \end{aligned}$$