

3.2 - Adding Rational Numbers

Recall that when adding and subtracting fractions:

- 1) convert any mixed numbers to improper fractions
- 2) make the fractions compatible by creating Common denominators
- 3) add the numerators and keep the same denominator
- 4) if the answer is an improper fraction, convert it into a mixed number

Ex 1: Evaluate.

3, 6, 9, 12, 15
5, 10, 15

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

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

$$= \frac{10}{15} + \left(-\frac{3}{15}\right) = \frac{7}{15}$$

(b) $-2\frac{5}{8} + \left(-\frac{7}{2}\right)$

$$= -\frac{21}{8} + \left(-\frac{7}{2}\right) \times \frac{4}{4}$$

$$= -\frac{21}{8} + \left(-\frac{28}{8}\right) = -\frac{49}{8} = -6\frac{1}{8}$$

If you don't want to convert mixed numbers to improper fractions, you can add the whole numbers and add the fraction pieces separately, but be careful if one of the terms is negative!

Ex. 2: Evaluate using two different methods: $-3\frac{1}{4} + 2\frac{5}{6}$

~~Method 1~~ - Convert mixed to improper

~~Method 2~~ - Add the whole numbers and add the fraction pieces

4, 8, 12
6, 12

$$-\frac{13}{4} + \frac{17}{6}$$

$$= -\frac{39}{12} + \frac{34}{12}$$

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

$$= -3 + \left(-\frac{1}{4}\right) + 2 + \frac{5}{6}$$

$$= (-3 + 2) + \left(-\frac{1}{4} + \frac{5}{6}\right)$$

$$= -1 + \left(\frac{-3}{12} + \frac{10}{12}\right)$$

$$= -1 + \frac{7}{12}$$

$$= -\frac{12}{12} + \frac{7}{12} = -\frac{5}{12}$$

Use what you know about adding integers to add rational numbers in decimal form.

Ex. 3: At the beginning of November, the Frosty Snow Blower Company was \$235.46 in debt. By the end of November, the company had increased its debt by \$156.71.

- (a) Write an expression to represent this situation, then calculate how much money the company owed at the end of November.

$$-235.46 + -156.71$$

$$\begin{array}{r} -235.46 \\ + -156.71 \\ \hline -392.17 \end{array}$$

- (b) By the end of December, the company earned a net amount of \$462.58. Is the company still in debt or has it made a profit?

$$-392.17 + 462.58$$

$$\begin{array}{r} 462.58 \\ - 392.17 \\ \hline + 70.41 \end{array}$$

Ex. 4: On a particular day in December, the temperature was -13.4°C in the morning and rose 7.6°C . What was the highest temperature that day?

$$-13.4 + 7.6$$

$$\begin{array}{r} -13.4 \\ + 7.6 \\ \hline -5.8 \end{array}$$

$$\begin{array}{r} -13.4 \\ \hline + 7.6 \end{array}$$

Assignment: Blue 3.1 Practice