

Math 9

Section 3.2-3.3: Addition and Subtraction of Rational Numbers

Recall Adding/subtracting Integers

ex's $(-2) + (-1) =$
 $-6 + (-4) =$
 $-2 + -21 =$

ex's $7 + (-4) =$
 $(+3) + (+1) =$
 $(+9) + (-8) =$

ex's $(+8) + (-12) =$
 $(+5) + (-19) =$
 $2 + -9 =$

ex's $(-8) + (+5) =$
 $-14 + (+10) =$
 $-5 + 2 =$

ex's (a) $-5 + (+3) + (-9)$
 $= -2 + (-9)$
 $= -11$

(b) $(+7) + (-2) + (-7) + (+4)$
 $= +5 + (-7) + (+4)$
 $= -2 + (+4)$
 $= +2$

For subtracting we add the opposite:

Example: (a) $(+5) - (+3)$
 $(+5) + (-3)$
 2

(b) $7 - (-4)$
 $7 + (+4)$
 11

(c) $-4 - (-2) - (+3)$
 $-4 + (+2) + (-3)$
 $-2 + (-3)$
 -5

Adding Fractions/ Decimals

EX. 1 (a) $\frac{-7}{9} + \frac{5}{9} =$

Q – What do you need to add or subtract fractions?

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

(c) $\left(\frac{-7}{9}\right) + \left(\frac{2}{3}\right)$

: necessary to find a common denominator

(i.e. make the bottom #'s the same)

$$\left(\frac{-7}{9}\right) + \left(\frac{2}{3}\right) \begin{matrix} \times 3 \\ \times 3 \end{matrix}$$

LCD = 9 : we need to multiply **both** numerator and denominator by 3. (WHY?)

$$\left(\frac{-7}{9}\right) + \left(\frac{6}{9}\right) :$$

combine the top numbers only.

$$\frac{-1}{9}$$

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

: LCD = 15

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

$$= \frac{-5}{15} + \frac{-9}{15}$$

$$= \frac{-14}{15}$$

(e) $\left(1\frac{1}{2}\right) + \left(-2\frac{1}{3}\right)$: change to improper fractions first

$$= \left(\frac{3}{2}\right) + \left(\frac{-7}{3}\right) \quad : \text{LCD} = 6$$

$$= \frac{9}{6} + \left(\frac{-14}{6}\right)$$

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

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

(g) $(-8.93) + (-1.25)$

$$= \begin{array}{r} (-8.93) \\ + (-1.25) \\ \hline (-11.18) \end{array}$$

(h) $(-3.34) + (+1.25) = -2.09$

Subtracting Fraction/Decimals

EX. 2 (a) $\frac{5}{7} - \frac{3}{7} =$

(b) $\left(\frac{+1}{5}\right) - \left(\frac{-2}{5}\right)$:add the opposite

$$\left(\frac{+1}{5}\right) + \left(\frac{+2}{5}\right) \quad : \text{combine top numbers}$$

$$\frac{3}{5}$$

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

$$(c) \left(\frac{-4}{5}\right) - \left(\frac{-1}{2}\right) \quad : \text{ add the opposite}$$

$$= \left(\frac{-4}{5}\right) + \left(\frac{+1}{2}\right) \quad : \text{ determine the lowest common denominator } \rightarrow \text{LCD} = 10$$

$$= \left(\frac{-4}{5}\right)_{\times 2} + \left(\frac{+1}{2}\right)_{\times 5} = \left(\frac{-8}{10}\right) + \left(\frac{+5}{10}\right) = \frac{-3}{10}$$

$$(d) \left(-1\frac{1}{4}\right) - \left(-2\frac{2}{3}\right) \quad : \text{ change to improper fractions}$$

$$= \left(-\frac{5}{4}\right) + \left(+\frac{8}{3}\right) \quad : \text{ add the opposite}$$

$$= \left(-\frac{5}{4}\right)_{\times 3} - \left(-\frac{8}{3}\right)_{\times 4} \quad : \text{ find the lowest common denominator } \quad \text{LCD} = 12$$

$$= \left(-\frac{15}{12}\right) + \left(+\frac{32}{12}\right) \quad : \text{ combine top numbers}$$

$$= \left(+\frac{17}{12}\right) \quad : \text{ simplify}$$

$$= 1\frac{5}{12}$$

$$(e) (+0.23) - (-1.46) \quad : \text{ add the opposite}$$
$$= (+0.23) + (+1.46)$$

$$\begin{array}{r} 0.23 \\ + 1.46 \\ \hline 1.69 \end{array}$$

ANS: +1.69

$$(f) (-1.39) - (-2.41)$$
$$= (-1.39) + (+2.41)$$

$$\begin{array}{r} 2.41 \\ - 1.39 \\ \hline 1.02 \end{array}$$

ANS: + 1.02