

Curriculum Outcome

N1: Demonstrate an understanding of rational numbers by: comparing and ordering rational numbers; solving problems that involve arithmetic operations on rational numbers.

Student Friendly:

“Subtracting Fractions and Subtracting Decimals”

Section 3.3

Subtracting Rational Numbers

When subtracting Rational Numbers you must have a ...

Common Denominator

Ex) $\frac{13}{7} - \frac{4}{7} = \frac{9}{7}$

Same Denominators

This look similar to adding Rational Numbers



You try ...

(Remember to write all solution in simplest form)

$$1 \quad \frac{21}{2} - \frac{24}{2}$$

$$= \frac{-3}{2}$$

$$2) \quad \frac{-25}{13} - \frac{16}{13}$$

$$= -\frac{41}{13}$$

$$3) \quad \frac{11}{4} - \frac{5}{4}$$

$$= \frac{6}{4} \\ = \frac{3}{2}$$

Oh, what to do when the denominators are different???



I Know this one!!!!





When denominators are different
you have to find a "common
denominator"



How

By determining the **LCM**

Lowest Common Multiple
(of the denominators)

Subtract the following rational numbers



$$\frac{13}{7} - \frac{4}{3}$$
$$\begin{array}{r} \times 3 \quad \quad \quad \times 7 \\ \hline 39 \quad - \quad 28 \\ 21 \quad \quad 21 \end{array}$$

Look at the multiples of each denominator

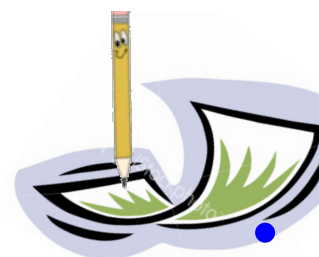
Find the LCM

7

3

$$\frac{11}{21}$$

You try...



$$1) \frac{17}{12} - \frac{4}{9}$$

$$\begin{array}{r} \times 3 \quad \times 4 \\ \frac{51}{36} - \frac{16}{36} \end{array}$$

$$= \frac{35}{36}$$

$$3) \frac{-2}{7} - \frac{-5}{28}$$

$$\begin{array}{r} \times 4 \\ \frac{-8}{28} + \frac{+5}{28} \end{array}$$

$$\frac{-3}{28}$$

Subtracting Negative Numbers

$$8 - (-2) \longrightarrow \text{We add the opposite: } 8 + 2 =$$

No difference with rational numbers

$$\frac{6}{5} - \left(\frac{-10}{5}\right) \longrightarrow \text{We add the opposite: } \frac{6}{5} + \frac{10}{5} =$$

Subtracting Rational Numbers in Mixed Number Form

$$3\frac{1}{5} - 2\frac{7}{10}$$

Handwritten annotations: Red arrows show the conversion of the mixed numbers to improper fractions. For $3\frac{1}{5}$, an arrow goes from the 3 to the denominator 5, and another from the 3 to the numerator 1, with a '+' sign above the 1 and an 'x' below the 5. For $2\frac{7}{10}$, an arrow goes from the 2 to the denominator 10, and another from the 2 to the numerator 7, with a '+' sign above the 7 and an 'x' below the 10.

Option 1

STEP 1) Write each mixed number as an improper fraction

$$\frac{16}{5} - \frac{27}{10}$$

STEP 2) Find common denominators and then subtract like before

$$\frac{32}{10} - \frac{27}{10}$$

A green bracket on the left side of the equation spans from the first fraction to the second, with a green 'x2' written above it, indicating the multiplication of the first fraction by 2 to get a common denominator.

$$= \frac{5}{10}$$

STEP 3) Reduce all fractions

$$\frac{1}{2}$$

Subtracting Rational Numbers in Mixed Number Form

$$3\frac{1}{5} - 2\frac{7}{10}$$

Option 2

STEP 1) Work with your integers first

$$3 - 2 = 1$$

STEP 2) Work with your fraction

$$\begin{array}{r} \frac{1}{5} - \frac{7}{10} \\ \times 2 \quad \left\{ \begin{array}{r} \frac{2}{10} - \frac{7}{10} \\ = \frac{-5}{10} \end{array} \right. \end{array}$$

STEP 3) Put step 1 & 2 answers together (must be careful here)

$$1 + \frac{-5}{10}$$

$$\frac{10}{10} + \frac{-5}{10}$$

$$\frac{5}{10}$$

$$= \frac{1}{2}$$

Your Turn



$$1) \quad -2\frac{2}{9} - \left(-3\frac{1}{3}\right)$$

$$2) \quad 6\frac{1}{2} - 3\frac{1}{7}$$

Your Turn

$$1) -2\frac{2}{9} \oplus \left(\oplus 3\frac{1}{3} \right)$$

$$-2 + +3 = \boxed{1}$$

$$\frac{-2}{9} + +\frac{1}{3}$$

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

$$\boxed{1\frac{1}{9}}$$

$$1 + \frac{1}{9} = 1\frac{1}{9}$$



$$-2\frac{2}{9} - \left(-3\frac{1}{3} \right)$$

$$-\frac{20}{9} + \left(+\frac{10}{3} \right)$$

$$\frac{-20}{9} + \frac{30}{9}$$

$$\frac{10}{9}$$

$$\boxed{= 1\frac{1}{9}}$$

Your Turn

$$2) \quad 6\frac{1}{2} - 3\frac{1}{7}$$

$$6 - 3 = \boxed{3}$$

$$\frac{1}{2} - \frac{1}{7}$$

$$\frac{7}{14} - \frac{2}{14}$$

$$\boxed{\frac{5}{14}}$$

$$3 + \frac{5}{14}$$

$$= 3\frac{5}{14}$$



$$6\frac{1}{2} - 3\frac{1}{7}$$

$$\frac{13}{2} - \frac{22}{7}$$

$$\frac{91}{14} - \frac{44}{14}$$

$$= \frac{47}{14}$$

$$= 3\frac{5}{14}$$

Class/Homework



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