LEARNING OBJECTIVE: We will solve equations that represent real world problems involving rational numbers (G7M2L18)

FRACTIONS / DECIMALS

CONCEPT DEVELOPMENT:

The same concepts of Making 0 and Making 1 apply to rational numbers as they do to integers.

Additive Identity: 0
$x + 0 = x$

MAKING ZERO: We can use addition or subtraction properties of
equality to make zero.
Example: If $x + 2.55 = 9$, then $x + 2.55 - 2.55 = 9 - 2.55$

If $x + 6.80 = 2$ then $x + 6.80 - 6.80 = 2 - 6.80$
If $x + 4 = 5.5$ then $x + 4 - 4 = 5.5 - 4$
$x + 5 = 10$ then $x + 5 - 5 = 10 - 5$

Multiplicative Identity : 1
$x \cdot 1 = x$

MAKING ONE: We can use the multiplication and division properties of
equality to make 1.
Example: If $\frac{4}{3}x = 24$, *then* $\frac{3}{4} \cdot \frac{4}{3}x = \frac{3}{4} \cdot 24$

If $\frac{1}{2}x = 24$, then $\frac{2}{1}(\frac{1}{2}x) = \frac{2}{1}(24)$
If $7x = 35$ then $\frac{1}{7}(7x) = \frac{1}{7}(35)$
If $\frac{1}{2}x = 4$ then $\frac{2}{1}(\frac{1}{2}x) = \frac{2}{1}(4)$

GUIDED PRACTICE:

Steps for Solving Equations Involving Rational Numbers
1. Read the problem carefully.
2. Use addition or subtraction properties of equality and If-Then Moves to make 0.
3. Use multiplication or division properties of equality and If-Then Moves to make 1.
4. Isolate your variable, and interpret your answer.
5. Check your work.

If $33 = \frac{2}{5}x - 7$

then $33 + 7 = \frac{2}{5}x (-7 + 7)$ ← MAKES "0"

If $40 = \frac{2}{5}x$

→ MAKES "1"

then $\frac{5}{2}(40) = \frac{5}{2}(\frac{2}{5}x)$

$\frac{5}{2} \cdot \frac{40\,20}{1} = \frac{100}{1}$ $\boxed{100 = x}$

If $3 = \frac{2}{3}x + 9$

then $3 - 9 = \frac{2}{3}x (+9 - 9)$ MAKES 0

If $-6 = \frac{2}{3}x$

MAKES 1

$\frac{3}{2}(-6) = (\frac{3}{2} \cdot \frac{2}{3}x)$

$\boxed{-9 = x}$

When x is in numerator of a fraction, MULTIPLY TO GET RID OF DENOMINATOR!

$$\frac{x-6}{3} = -5$$

If $\frac{x-6}{3} = -5$

then $\frac{3}{1}\left(\frac{x-6}{3}\right) = \frac{3}{1} \cdot \frac{-5}{1}$ ← CLEARING THE FRACTION

$x - 6 = -15$

$x - 6 + 6 = -15 + 6$

$\boxed{x = -9}$

CHECK

$\frac{x-6}{3} = -5$

$\frac{-9-6}{3} \stackrel{?}{=} -5$

$\frac{-15}{3} \stackrel{?}{=} -5$

$-5 \stackrel{\checkmark}{=} -5$

$\cancel{5}\left(\frac{3x+4}{\cancel{5}}\right) = (5)5$

$3x + 4 = 25$

$-4 \mid -4$

$\frac{3x}{3} = \frac{21}{3}$

$\boxed{x = 7}$

CHECK

$\frac{3x+4}{5} = 5$

$\frac{3(7)+4}{5} \stackrel{?}{=} 5$

$\frac{21+4}{5} \stackrel{?}{=} 5$

$\frac{25}{5} \stackrel{?}{=} 5$

$5 \stackrel{\checkmark}{=} 5$

At the Santa Cruz Boardwalk, you buy a chocolate dipped cone that costs $2.89. You also buy 3 bottles of water. You pay with a $10 bill and receive no change. How much does each bottle of water cost?

$10 - 2.89 - (3w) = 0$

$3w + 2.89 = 10$

$(10 - 2.89) \div 3 = b$

$b = \frac{10 - 2.89}{3}$

$3w + 2.89 = 10.00$

$-2.89 \mid -2.89$

$\frac{3w}{3} = \frac{7.11}{3}$

$w = 2.37$

Water is $2.37

On Monday I walked $2\frac{1}{2}$ miles. For the other days of the school week I walked the same distance each day. If I ended up walking 9.5 miles from Monday-Friday, how far did I walk on each of the other days of the week?

$2.5 + 4m = 9.5$

$-2.5 \mid -2.5$

$\frac{4m}{4} = \frac{7}{4}$

$m = \frac{7}{4}$

$m = 1.75$ or $1\frac{3}{4}$ miles

Last Halloween, Madison ate $\frac{1}{4}$ of her candy the first night after she came home from trick or treating. The day after trick or treating, she got 6 more pieces of candy from her little brother. At that point, she had 36 pieces of candy left to eat. <u>How much candy did she eat that night</u>? **Think about what fraction she had left over after eating $\frac{1}{4}$.**

Let c be the candy Madison got on Halloween.

$$\frac{3}{4}c + 6 = 36$$
$$\quad -6 \quad | \quad -6$$
$$\frac{3}{4}c = 30$$
$$\frac{4}{3}\left(\frac{3}{4}c\right) = \frac{4}{3}\left(\frac{30^{10}}{1}\right)$$
$$c = \frac{40}{1} = 40$$

Madison ate 10 pieces of candy that night

$$\frac{3}{4}\left(\frac{40}{1}\right) + 6 \overset{?}{=} 36$$
$$30 + 6 \overset{?}{=} 36$$
$$36 \overset{\checkmark}{=} 36$$

Ian receives a weekly allowance from his parents. He spent half of this week's allowance at the movies, but then he earned an additional $4.00 doing extra chores. If he didn't spend any other money and has $12.00 left over at the end of the week, how much is his allowance?

Let a be Ian's allowance

$$\frac{1}{2}a + 4 = 12$$
$$\quad -4 \quad | \quad -4$$
$$\frac{1}{2}a = 8$$
$$\frac{2}{1}\left(\frac{1}{2}a\right) = \frac{2}{1}\left(\frac{8}{7}\right)$$
$$a = 16$$

Ian's allowance is $16

Quincy is very excited about joining the travel softball team. She wants to know how much money she should save to pay for her team uniforms. If Quincy buys 4 team shirts, she will get a $10 discount so that the total cost of the 4 shirts would be $44.00. What is the regular price of a uniform?
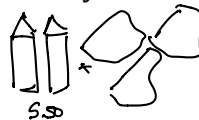
S is cost of shirt

$$4s - 10 = 44$$
$$\quad +10 \quad | \quad +10$$
$$4s = 54$$
$$\frac{4s}{4} = \frac{54}{4}$$
$$s = 13.50$$

Regular price of shirts is $13.50

CHECK
$$4(13.50) - 10 \overset{?}{=} 44$$
$$54 - 10 \overset{?}{=} 44$$
$$44 \overset{\checkmark}{=} 44$$

At Safeway, If you buy a gallon of milk which costs $5.50, you can get $3.75 back on 3 packages of Chips Ahoy. If you buy these items and pay $10.00 total, what is the (original price) of a package of Chips Ahoy?

c is package of chips ahoy

$$= 10$$

5.50

$$3c + 5.50 = 10.00$$
$$\quad -5.50 \quad | \quad -5.50$$
$$3c = 4.50$$
$$\frac{3c}{3} = \frac{4.50}{3}$$
$$c = 1.50 \quad \text{SALE PRICE}$$

DISCOUNT
$$\begin{array}{r} 1.25 \\ 3)\overline{3.75} \end{array}$$

$$\begin{array}{r} 1.50 \\ + 1.25 \\ \hline 2.75 \end{array}$$

ORIGINAL PRICE is $2.75 for a package of chips ahoy

Independent Practice:
None for this lesson!-Maybe a Kuta software??

Activating Prior Knowledge:
We can solve word problems by creating equations.

Companies will store your files (pictures, songs, movies, etc) on their servers for a fee. Google charges $10 for the first 100GB, and $5 for each additional 100 GB. If you spend $35 on cloud storage, how many GB are stored on the Google Server?	Your piggy bank had $7.00 in it at the beginning of September. You put the same amount in every day of the month. At the end of the month, you have $67.00. How much money did you put in your piggy bank each day?

Closure:
Andrew's math teacher entered the 7th grade students in a math competition. There was an enrollment fee of $30, and also an $11 charge for each packet of 10 tests. The total cost was $151. How many tests were purchased?

Teacher Notes:
HW should be Problem set from lesson 23.