Equations Warm-up: Practice with Fractions

Learning objectives:

3.A.1 To add, subtract, multiply and divide fractions using numbers and symbols

To add (or subtract) fractions, you need to get the denominators the same so you are adding (or subtracting) "like things". Using an analogy, you can't add 3 bananas and 2 apples unless you say "that's 5 pieces of *fruit*".

So to add $\dfrac{1}{3} + \dfrac{1}{2}$ you need to find a number for the denominator that works for both fractions. To do this, just multiply them together i.e. 3 x 2 = 6.

Now $\dfrac{1}{3} = \dfrac{2}{6}$ and $\dfrac{1}{2} = \dfrac{3}{6}$ so you've turned the "bananas" into "fruit" and the "apples" into "fruit" and now you can add them ...

$$\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$$

This also works with symbols.

Let's try $\dfrac{2}{x} + \dfrac{3}{2}$. Now multiply the denominators together to get 2x.

Then $\dfrac{2}{x} = \dfrac{4}{2x}$ and $\dfrac{3}{2} = \dfrac{3x}{2x}$. and now you can add them,

$$\frac{4}{2x} + \frac{3x}{2x} = \frac{4 + 3x}{2x}.$$

To multiply fractions you just multiply the top two together and multiply the bottom two together.

So to multiply $\dfrac{2}{3} \times \dfrac{5}{2} = \dfrac{10}{6}$

Then you have to simplify as much as you can.

Try dividing the top and bottom by 2, $\dfrac{10}{6} = \dfrac{5}{3}$

To divide fractions you just turn the second one over and multiply.

So to divide $\dfrac{2}{3} \div \dfrac{5}{2} = \dfrac{2}{3} \times \dfrac{2}{5} = \dfrac{4}{15}$

This is just the same for symbols, $\dfrac{2}{x} \div \dfrac{3}{2} = \dfrac{2}{x} \times \dfrac{2}{3} = \dfrac{4}{3x}$

QUESTIONS:

Do the following questions without a calculator. Check your answer (answers at the end) and if you are incorrect there is plenty of feedback to help.

Q1. Write the following as a simple fraction: $\dfrac{1}{3} + \dfrac{5}{8}$

Q2. Write the following as a simple fraction: $\dfrac{5}{6} - \dfrac{5}{8}$

Q3. Write the following as a simple fraction: $\dfrac{1}{x} + \dfrac{1}{y}$

Q4. Write the following as a simple fraction: $\dfrac{2}{x} - \dfrac{1}{2x}$

Q5. Write the following as a simple fraction: $\dfrac{3}{22} \times \dfrac{8}{5}$

Q6. Write the following as a simple fraction: $\dfrac{2}{y} \times \dfrac{1}{2x}$

Q7. Write the following as a simple fraction: $\dfrac{3}{2} \div \dfrac{6}{5}$

Q8. Write the following as a simple fraction: $\dfrac{2}{y} \div \dfrac{1}{2x}$

ANSWERS:

A1. $\dfrac{8}{24} + \dfrac{15}{24} = \dfrac{23}{24}$

Note that you have to get the denominator to be the same for each term so you're adding "like" things.

One way to do this is to just multiply the denominators together i.e. 3 x 8 to get 24.

Then convert the fractions to the form $\dfrac{x}{24}$ so you are adding "like things" in this case "twenty-fourths"

$\dfrac{1}{3} = \dfrac{8}{24}$

$\dfrac{5}{8} = \dfrac{15}{24}$

Then you can add $\dfrac{8}{24}$ and $\dfrac{15}{24}$ to give $\dfrac{23}{24}$

A2. $\dfrac{20}{24} - \dfrac{15}{24} = \dfrac{5}{24}$

A3.
This is just like before,
multiply the denominators together (to get xy)

and express the fractions as $\dfrac{y}{xy}$ and $\dfrac{x}{xy}$.

Then you can add the numerators $\dfrac{y}{xy} + \dfrac{x}{xy} = \dfrac{y+x}{xy} = \dfrac{x+y}{xy}$

A4. $\dfrac{4}{2x} - \dfrac{1}{2x} = \dfrac{3}{2x}$

A5. $\dfrac{3 \times 8}{22 \times 5} = \dfrac{24}{110} = \dfrac{12}{55}$

You can just multiply the numerators together and multiply the denominators together.
Then simplify as much as possible, in this case dividing top and bottom by 2.

A6. $\dfrac{2}{2xy} = \dfrac{1}{xy}$

A7. $\dfrac{5}{4}$

To divide by something, you turn it upside down and multiply.

$$\dfrac{3}{2} \div \dfrac{5}{6}$$

$$= \dfrac{3}{2} \times \dfrac{5}{6}$$

$$= \dfrac{15}{12}$$

$$= \dfrac{5}{4}$$

Then simplify as much as possible (in this case, dividing top and bottom by 3).

A8. $\dfrac{2}{y} \times \dfrac{2x}{1} = \dfrac{4x}{y}$