Date:_____

6.3 & 6.4 Notes: Multiplying Proper Fractions

Multiplying without a Diagram

Remember, a fraction is really a ___DIVISION___ question, so $\frac{3}{7}$ really means ___$3 \div 7$___

This means that $\frac{2}{5} \times \frac{3}{7}$ really means ___$\frac{2}{5} \times 3 \div 7$___

Recall the shortcuts for multiplying and dividing by a whole number:

Multiplying → JUST MULTIPLY THE WHOLE INTO THE __NUMERATOR__

Dividing → JUST MULTIPLY THE WHOLE INTO THE __DENOMINATOR__

Multiply

$$\frac{2}{5} \times \frac{3}{7} =$$

$= \frac{2}{5} \times 3 \div 7$

$= \frac{6}{5} \div 7$

$= \boxed{\frac{6}{35}}$

$$\frac{3}{4} \times \frac{1}{2} =$$

$= \frac{3}{4} \times 1 \div 2$

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

$= \boxed{\frac{3}{8}}$

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

$= \frac{2}{3} \times 2 \div 3$

$= \frac{4}{3} \div 3$

$= \boxed{\frac{4}{9}}$

Look at the numerators and denominators for the fractions in the question and the answer. What do you notice about them?

Summary:
When multiplying two proper fractions:

multiply the numerators to find the numerator of the product

multiply the denominators to find the denominator of the product.

Remember to reduce to lowest terms

$$\frac{2}{3} \times \frac{3}{7} = \frac{6}{21}$$

$$\boxed{\frac{2}{7}}$$

$$\frac{3}{4} \times \frac{2}{5} = \frac{6}{20}$$

$$\boxed{\frac{3}{10}}$$

$$\frac{3}{4} \times \frac{2}{9} \times \frac{2}{3} = \frac{12}{108}$$

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

How hard do you think it might be to reduce the answer to $\frac{15}{16} \times \frac{8}{35}$?

Note: It is actually possible to cross reduce before you multiply!

$$\frac{2}{{}_1 3} \times \frac{3^{\,1}}{7} = \boxed{\frac{2}{7}}$$

$$\frac{3}{{}_2 4} \times \frac{2^{\,1}}{5} = \boxed{\frac{3}{10}}$$

$$\frac{{}^1 3}{{}_2 4} \times \frac{2^{\,1}}{9} \frac{}{3} = \boxed{\frac{1}{6}}$$

$$\text{OR:} \frac{{}^1 3}{{}_1 4} \times \frac{2^{\,1}}{9} \times \frac{2^{\,1}}{3}{}_1 = \boxed{\frac{1}{9}}$$

When can you cross reduce?
When you are reducing the ___NUMERATOR___ of one fraction and the ___DENOMINATOR___
of another

$$\text{Eg: } \frac{{}^1 3}{4} \times \frac{5}{{}_{12}\,4} = \boxed{\frac{5}{16}}$$

$$\text{Eg: } \frac{2}{{}_1 5} \times \frac{4}{7} \times \frac{5^{\,1}}{7} = \boxed{\frac{8}{49}}$$

Eg. In Jaycee's Pet store, three-eighths of the animals are fish, and two-fifteenths of the fish are tropical fish. __What fraction of the animals__ in the store are tropical fish?
$$\rightarrow x$$

$$x = \frac{2}{15} \text{ of } \frac{3}{8}$$

$$= \frac{2}{15} \times \frac{3}{8}$$

$$\boxed{\text{CROSS REDUCE}}$$

$$= \frac{1}{5} \times \frac{1}{4}$$

$$x = \frac{1}{5} \times \frac{1}{4}$$

$$x = \boxed{\frac{1}{20}}$$