

# WALT: multiply and divide fractions

## WILF

1. Use knowledge of times tables
2. Multiply the numerators together then multiply the denominators together
3. Keep, change, flip for division

Can you name the parts of a fraction?


numerator  3

denominator  4

—

What sort of fractions / numbers are these:

proper fraction   $\frac{7}{8}$

mixed number   $2\frac{3}{8}$

improper fraction   $\frac{9}{7}$

# Multiplying Fractions

$$\frac{2}{3} \times \frac{3}{4} = \frac{2 \times 3}{3 \times 4} = \frac{6}{12} = \frac{1}{2}$$

1. Multiply the numerators.
2. Multiply the denominators.
3. Cancel down.



# Multiplying mixed numbers.

$$2\frac{2}{5} \times \frac{1}{2} = \frac{12}{5} \times \frac{1}{2} = \frac{12}{10} = \frac{6}{5} = 1\frac{1}{5}$$

1. Change the mixed number to an improper fraction.
2. Multiply as before.
3. Cancel down and change to mixed number if necessary.



## Multiplying fractions and whole numbers

$$12 \times \frac{5}{6} = \frac{12}{1} \times \frac{5}{6} = \frac{60}{6} = 10$$

1. Whole numbers have a denominator of 1.
2. Multiply numerators and denominators.
3. Cancel down and change to a mixed number if necessary.





Cancelling down.

It is often easier to cancel down before you multiply.

**When you are multiplying fractions**, any numerator can be cancelled against any denominator.

**After multiplication**

$$\frac{5}{8} \times \frac{16}{25} = \frac{80}{200} = \frac{2}{5}$$

**Before multiplication**

$$\frac{\overset{1}{\cancel{5}}}{\underset{1}{\cancel{8}}} \times \frac{\overset{2}{\cancel{16}}}{\underset{5}{\cancel{25}}} = \frac{2}{5}$$

## Cancelling after multiplication

$$\frac{7}{12} \times \frac{16}{49} = \frac{112}{588} = \frac{4}{21}$$

## Cancelling before multiplication

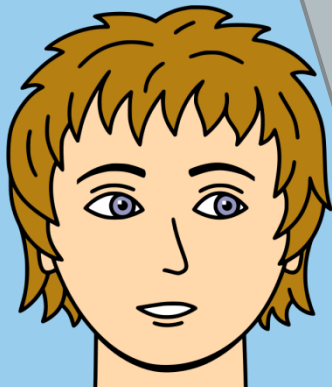
$$\overset{1}{\cancel{7}} \underset{3}{\cancel{12}} \times \overset{4}{\cancel{16}} \underset{7}{\cancel{49}} = \frac{4}{21}$$

Which is easier?

Multiplying always makes things bigger:

$$2 \times 3 = 6$$

6 is bigger than both 2 and 3



Is he  
correct?

If you multiply a number by 1,  
it does not increase or decrease.

$$3 \times 1 = 3$$

If you multiply a number by 0, you get 0

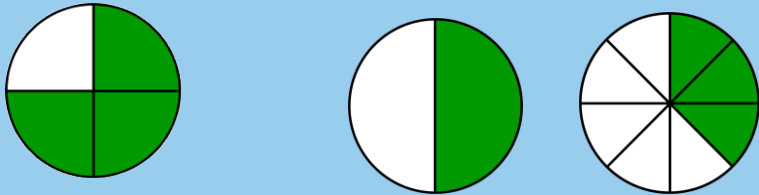
$$3 \times 0 = 0$$

If you multiply a number larger than 1 by a  
proper fraction, the product is less than the  
original number.

$$4 \times \frac{1}{2} = 2 \quad (2 < 4)$$

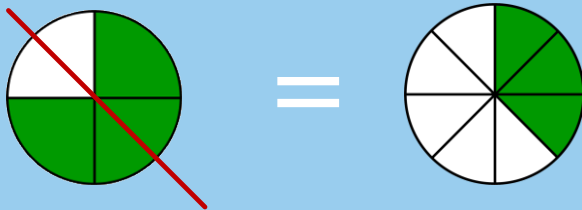
If you multiply two proper fractions together, the product is less than either of them:

$$\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$$

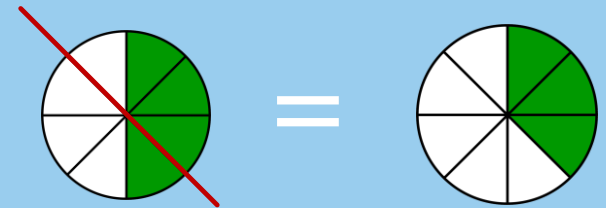


of means  $\times$

$$\frac{1}{2} \text{ of } \frac{3}{4} = \frac{3}{8}$$



$$\frac{3}{4} \text{ of } \frac{1}{2} = \frac{3}{8}$$



# Dividing Fractions

$$\frac{3}{4} \div \frac{1}{3} = \frac{3}{4} \times \frac{3}{1} = \frac{9}{4} = 2\frac{1}{4}$$

1. Turn the dividing fraction upside down and change  $\div$  to  $\times$ .
2. Multiply numerators and denominators.
3. If necessary cancel down and change to a mixed number.





# Dividing mixed numbers.

$$2\frac{2}{5} \div \frac{1}{2} = \frac{12}{5} \div \frac{1}{2} = \frac{12}{5} \times \frac{2}{1} = \frac{24}{5} = 4\frac{4}{5}$$

1. Change the mixed number to an improper fraction.
2. Divide as before.
3. Cancel down and change to a mixed number if necessary.



## Dividing fractions and whole numbers

$$8 \div \frac{3}{5} = \frac{8}{1} * \frac{5}{3} = \frac{40}{3} = 13\frac{1}{3}$$

1. Whole numbers have a denominator of 1.
2. Turn dividing fraction upside down and multiply numerators and denominators.
3. Cancel down and change to a mixed number if necessary.

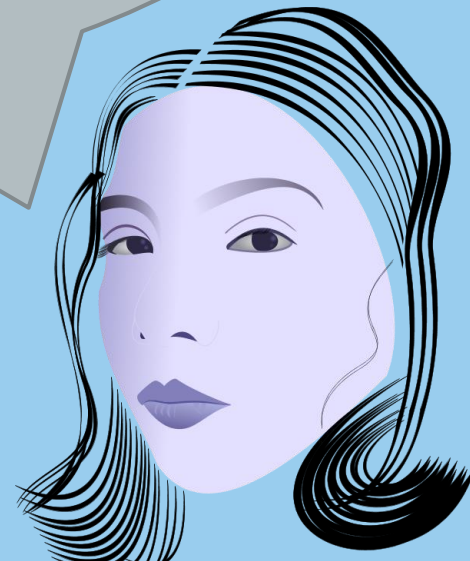


Division always makes things smaller. If I divide up a rich, tasty chocolate cake, I always get a smaller piece than the whole cake.

$$12 \div 4 = 3$$

3 is less than 12

Is she  
correct?



If you divide a number by 1,  
it does not increase or decrease.

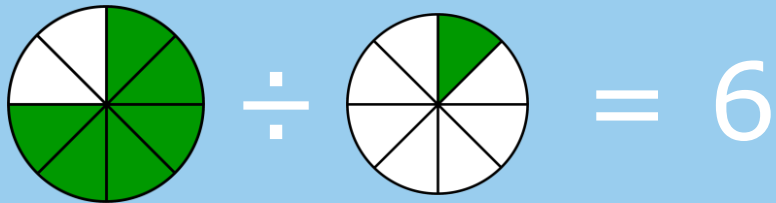
$$3 \div 1 = 3$$

If you divide 1, or a number larger than 1,  
by a proper fraction, the answer is greater  
than the original number.

$$4 \div \frac{1}{2} = 8 \quad (8 > 4)$$

If you divide a larger fraction by a smaller one, the answer will be more than 1.

$$\frac{3}{4} \div \frac{1}{8} = 6$$



How many  $\frac{1}{8}$  are there in  $\frac{3}{4}$ ? 6

$$1) \quad \frac{1}{3} \times \frac{1}{3} =$$

$$2) \quad \frac{1}{5} \times \frac{1}{5} =$$

$$3) \quad \frac{1}{6} \times \frac{1}{6} =$$

$$4) \quad \frac{2}{7} \times \frac{4}{5} =$$

$$5) \quad \frac{1}{2} \times \frac{2}{5} =$$

$$6) \quad \frac{1}{2} \div \frac{1}{4} =$$

$$7) \quad \frac{1}{5} \div \frac{3}{10} =$$

$$8) \quad \frac{1}{6} \div \frac{1}{12} =$$

$$9) \quad \frac{7}{2} \div \frac{5}{4} =$$

$$10) \quad \frac{9}{7} \div \frac{1}{14} =$$



$$1) \quad \frac{7}{9} \times \frac{4}{5} =$$

$$6) \quad \frac{7}{9} \div \frac{4}{7} =$$

$$2) \quad \frac{6}{7} \times \frac{11}{12} =$$

$$7) \quad \frac{6}{7} \div \frac{11}{12} =$$

$$3) \quad \frac{10}{11} \times \frac{12}{15} =$$

$$8) \quad \frac{14}{15} \div \frac{8}{9} =$$

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

$$9) \quad \frac{16}{17} \div \frac{21}{23} =$$

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

$$10) \quad 4\frac{1}{3} \div \frac{1}{2} =$$