**Study the following.**

of – when you are talking about fractions, "of" means times.

½ of 4 means ½ × 4

4 circles O O O O

½ of them O O O O

equals 2

**Write the definition in your own words.**

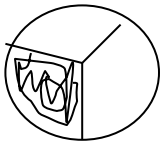
of

**Show 1/3 of 6 using pictures.**

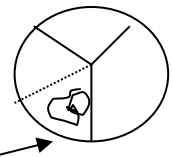
**Study the following example.**

$\frac{1}{2}$ of $\frac{1}{3}$ =

1/3



½ of 1/3



equals 1/6

**Show ½ of ¼ using pictures.**

**Study the following.**

Instead of using pictures, you can multiply.

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

Multiply the numerators, and the denominators to solve.

$\frac{1 \times 4}{2 \times 1} = \frac{4}{2}$ and the answer is $\frac{4}{2}$ or reduced to $\frac{2}{1}$ or 2.

Another example.

1/3 of 6 = 1/3 × 6 =

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

**Write as a multiplication problem.**

1. ½ of 8

2. ¼ of 12

3. 2/3 of 6

**Write as a multiplication problem and solve. Reduce if needed.**

1. 1/3 of 2/8

2. 5/10 of 2/4

3. 2/6 of 3/5

**Solve.**

1. ½ × ¾

2. 2/5 × 1/7

3. 2/3 × 1/5

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

5. $\frac{2}{7} \times \frac{1}{5} =$

6. $\frac{3}{4} \times \frac{5}{7} =$

7. $\frac{1}{2} \times \frac{1}{2} =$

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

9. $2 \times \frac{1}{5} =$

10. $3 \times \frac{1}{4} =$

11. $\frac{1}{6} \times 5 =$

12. $2 \times \frac{1}{3} =$

13. $\frac{1}{7} \times 3 =$

14. $\frac{5}{11} \times 2 =$

15. $3 \times \frac{4}{29} =$

16. $2 \times \frac{7}{15} =$

17. $5 \times \frac{1}{2} =$

**Study the following.**

You can reduce before multiplying fractions.

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

Reduce 2/4 first: $\frac{2}{4} \div \boxed{\frac{2}{2}} = \frac{1}{2}$

$\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$ Replace 2/4 with ½ and solve.

**Reduce the following before multiplying.**

1. $\frac{1}{4} \times \frac{3}{9} =$

2. $\frac{3}{12} \times \frac{7}{14} =$

3. $\frac{4}{6} \times \frac{4}{5} =$

4. $\frac{10}{15} \times \frac{2}{4} =$

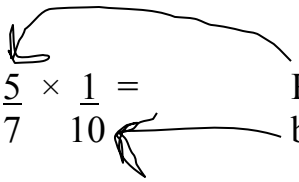
5. $\frac{5}{10} \times \frac{3}{7} =$

6. $\frac{4}{8} \times \frac{6}{9} =$

**Study the following.**

You can also reduce the numerator of one fraction with the denominator of another before multiplying.

Example: $\frac{5}{7} \times \frac{1}{10} =$



$\frac{5}{7} \times \frac{1}{10} =$ Reduce the 5 and the 10 by dividing them both by 5. (5÷5 =1 and 10÷5=2)

$\frac{\overset{\mathbf{1}}{\cancel{5}}}{7} \times \frac{1}{\cancel{10}_{\mathbf{2}}} =$ This is usually shown by crossing out the numbers and writing the reduced numbers nearby. This is often called "cancelling".

$\frac{\mathbf{1}}{7} \times \frac{1}{\mathbf{2}} = \frac{1}{14}$ Then multiply across to solve.

Example 2:

Sometimes you can "cancel" across both ways.

$\frac{\overset{\mathbf{1}}{\cancel{3}}}{10} \times \frac{8}{\cancel{9}_{\mathbf{3}}} =$ Reduce the 3 and the 9 by dividing by 3

$\frac{\mathbf{1}}{\cancel{10}_{\mathbf{5}}} \times \frac{\overset{\mathbf{4}}{\cancel{8}}}{\cancel{9}_{\mathbf{3}}} =$ Reduce the 8 and the 10 by dividing by 2

$\frac{\mathbf{1}}{\mathbf{5}} \times \frac{\mathbf{4}}{\mathbf{3}} = \frac{4}{15}$ Solve.

**Solve the following by "canceling" as much as possible first.**

1. $\frac{8}{9} \times \frac{3}{10} =$

2. $\frac{10}{27} \times \frac{3}{40} =$

3. $\frac{5}{12} \times \frac{16}{25} =$

4. $\frac{10}{49} \times \frac{7}{60} =$

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

6. $\frac{6}{20} \times \frac{15}{18} =$

**Study the following.**

Since multiplication and division can be done in any order, problems like the following can be reduced or "canceled" first before solving. "Cancel" any numerator with any denominator.

$$\frac{2 \times 3 \times 5 \times 7}{2 \times 6 \times 5 \times 21} =$$

$$\frac{\cancel{2} \times 3 \times \cancel{5} \times 7}{\cancel{2} \times 6 \times \cancel{5} \times 21}$$

Reduce 2/2 to 1/1 and reduce 5/5 to 1/1.

$$\frac{\cancel{2} \times \cancel{3} \times \cancel{5} \times \cancel{7}}{\cancel{2} \times \cancel{6} \times \cancel{5} \times \cancel{21}}$$

Reduce 3/6 to 1/2 and reduce 7/21 to 1/3.

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

Solve by multiplying across.

**Solve the following by reducing or "canceling" as much as possible first**.

1. $\dfrac{3 \times 5 \times 9 \times 11}{6 \times 5 \times 27 \times 44}$

2. $\dfrac{2 \times 3 \times 4 \times 7 \times 9 \times 10}{8 \times 9 \times 16 \times 21 \times 9 \times 20}$

3. $\dfrac{8 \times 7 \times 6 \times 4}{64 \times 49 \times 6 \times 8}$

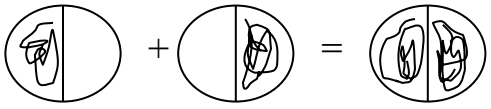
4. $\dfrac{4 \times 7 \times 10 \times 15}{6 \times 14 \times 15 \times 25}$

**Study the following.**

The following shows the difference between adding and multiplying fractions.

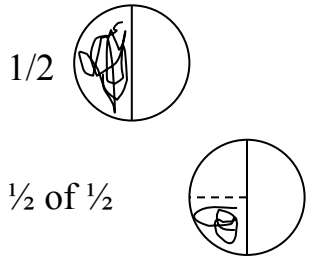
Adding fractions.

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



Multiplying fractions.

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




**Show the difference between adding and multiplying ¼ and ¼.**

**Add and multiply the following.**

1. 1/3 and 2/3

2. ¼ and ¼

3. 2/8 and 3/8

**Explain how you add fractions and how you multiply fractions.**

**Why do you keep the same denominator when you add fractions?**