

MULTIPLYING AND DIVIDING FRACTIONS

Multiplication

- Multiply the numerators and put in the numerator of the result
- Multiply the denominators and put in the denominator of the result

$$\frac{7}{8} \times \frac{4}{9} = \frac{7 \times 4}{8 \times 9} = \frac{28}{72} = \frac{7}{18}$$

Simplify by dividing by 4

Multiplication - *Let's Try It!*

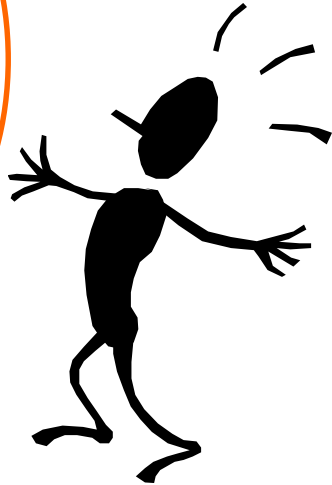
$$\frac{7}{9} \times \frac{1}{2} = \frac{7}{18}$$

$$\frac{4}{7} \times \frac{9}{11} = \frac{36}{77}$$

$$\frac{7}{5} \times \frac{1}{3} = \frac{7}{15}$$

$$\frac{30}{4} \times \frac{7}{14} = \frac{210}{56}$$

$$\begin{array}{r} 210 \\ \hline 56 \end{array}$$



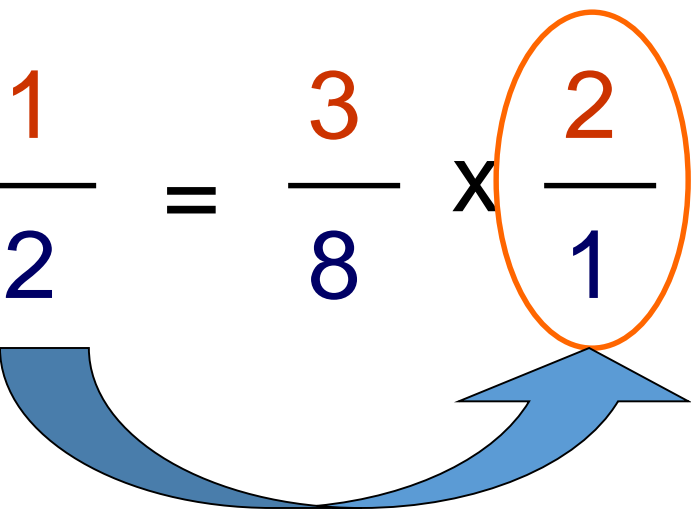
These numbers get pretty big!

What if we needed to multiply *again*?

Let's make the fraction more simple, so it will be easier to use in the future.

Division

- Just like multiplication with one more step
- Invert the second fraction and multiply

$$\frac{3}{8} \div \frac{1}{2} = \frac{3}{8} \times \frac{2}{1} = \frac{6}{8} = \frac{3}{4}$$


A blue curved arrow originates from the denominator '2' of the second fraction $\frac{1}{2}$ and points to the numerator '2' of the inverted fraction $\frac{2}{1}$. Another blue curved arrow originates from the numerator '1' of the second fraction $\frac{1}{2}$ and points to the denominator '1' of the inverted fraction $\frac{2}{1}$. The fraction $\frac{2}{1}$ is enclosed in an orange oval.

Division - *Let's Try It!*

$$\frac{7}{9} \div \frac{1}{2} = \frac{14}{9}$$

$$\frac{4}{7} \div \frac{9}{11} = \frac{44}{63}$$

$$\frac{7}{5} \div \frac{1}{3} = \frac{21}{5}$$

$$\frac{20}{4} \div \frac{7}{10} = \frac{50}{7}$$

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

$$\begin{aligned}
 & \frac{1}{2} \times 1\frac{2}{3} + 2\frac{1}{6} \\
 &= \frac{1}{2} \overset{\curvearrowright}{\times} \overset{\curvearrowleft}{\frac{5}{3}} + \frac{13}{6} \\
 &= \frac{5}{6} + \frac{13}{6} \\
 &= \frac{18}{6} \\
 &= 3
 \end{aligned}$$

$$\frac{3}{5} \text{ of } 15 - 1\frac{1}{5}$$

$$\frac{3}{5} \text{ of } 15 - 1\frac{1}{5}$$

$\frac{3}{5} \times \frac{15}{1} - 1\frac{1}{5}$ $= \frac{9}{1} - 1\frac{1}{5}$ $= \frac{9 \times 5}{1 \times 5} - \frac{6}{5}$ $= \frac{45}{5} - \frac{6}{5}$ $= \frac{39}{5} = 7\frac{4}{5}$	$\frac{3}{5} \text{ of } 15 - 1\frac{1}{5}$ <p>1 part of a whole</p> $= 15 \div 5 = 3 \times 3 = 9$ $= \frac{9 \times 5}{1 \times 5} - \frac{6}{5}$ $= \frac{45}{5} - \frac{6}{5}$ $= \frac{39}{5}$ $= 7\frac{4}{5}$
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$$\frac{2}{3} + \frac{4}{5} \times \frac{15}{16} \div \frac{1}{6}$$

$$\frac{2}{3} + \frac{4}{5} \times \frac{3}{4} - \frac{1}{6} \quad \swarrow \text{flip and times}$$

$$= \frac{2}{3} + \frac{6}{5} \times \frac{3}{4} - \frac{1}{6}$$

$$= \frac{2 \times 2}{3 \times 2} + \frac{9 \times 3}{2 \times 3}$$

$$= \frac{4}{6} + \frac{27}{6}$$

$$= \frac{31}{6}$$

$$= 5 \frac{1}{6}$$

$$\frac{11}{12} \times \frac{48}{22} \div \frac{1}{3} - \frac{1}{2}$$

$$\frac{41}{1+2} \times \frac{4}{222} \div \frac{1}{3} - \frac{1}{2}$$

$$= \frac{44}{32} \div \frac{1}{3} - \frac{1}{2}$$

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

$$= \frac{12}{2} - \frac{1}{2}$$

$$= \frac{11}{2}$$

$$= 5 \frac{1}{2}$$

- Ex 6.6 pg. 85

1. a) $\frac{3}{8}$
b) $\frac{2}{27}$
c) $\frac{20}{9}$
d) $\frac{7}{6} \times \frac{1}{3} = \frac{7}{18}$
e) $\frac{7}{5} \times \frac{1}{4} = \frac{7}{20}$

2. a) 10
b) $\frac{4}{5} \times \frac{90}{1} = 72$

Note: Cross cancelling some factors is a useful technique to teach when multiplying fractions.

- c) $\frac{30}{11} = 2\frac{8}{11}$
d) $\frac{9}{8} \times \frac{12}{1} = \frac{108}{8} = \frac{27}{2} = 13\frac{1}{2}$
e) $\frac{7}{3} \times \frac{9}{1} = \frac{63}{3} = 21$

3. Calculate and leave in simplest form:

a) $\frac{3}{14}$

b) $\frac{7}{1\,000}$

c) $\frac{1}{4} \times \frac{22\,500}{1} = 5\,625$

d) $\frac{12}{1} \times \frac{7}{12} = 7$

e) $\frac{3}{500} \times \frac{10\,000}{1} = \frac{3}{1} \times \frac{20}{1} = 60$

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c) $\frac{20}{9}$ $2\frac{2}{9}$
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- a) $\frac{3}{14}$
b) $\frac{7}{1000}$
c) $\frac{1}{4} \times \frac{22\,500}{1} = 5\,625$
d) $\frac{12}{1} \times \frac{7}{12} = 7$
e) $\frac{3}{500} \times \frac{10\,000}{1} = \frac{3}{1} \times \frac{20}{1} = 60$