Multiplication and Division of Fractions Worksheets

When multiplying fractions, simply multiply the numerators (top number of the fractions) together and multiply the denominators (bottom number of the fractions) together. It is good practice to check to see if any of the numbers can cancel. Canceling is done when the numerator and denominator can be divided *evenly* by the same number.

Note: canceling can happen top-to-bottom and/or diagonally but never across.

Ex. 1: $\frac{1}{2} \times \frac{2}{3} = \frac{2}{6}$ this product can be canceled. Divide the numbers in the fraction by 2 to get the canceled answer $\frac{2 \div 2}{6 \div 2} = \frac{1}{3}$.

The fractions in Ex. 1 can cancel before they are multiplied.

Ex. 1: $\frac{1}{\cancel{2}_{1}} \times \frac{\cancel{2}^{1}}{3} = \frac{1}{3}$

The 2's cancel by dividing by 2. Cross them out and place 1's close by. Now multiply the top numbers together, then the bottom numbers. The product is the final answer.

Ex. 2: $\frac{35}{40} \times \frac{100}{1000}$ can be rewritten as $\frac{\cancel{35}^{7}}{\cancel{40}_{8}} \times \frac{\cancel{100}^{1}}{\cancel{1000}_{10}} = \frac{7}{8} \times \frac{1}{10} = \frac{7}{80}$

Cancel by dividing by 5. Then cancel by dividing by 100. Multiply and get the product.

Ex. 3: $3 \times \frac{1}{3}$ can be written like. $\frac{\cancel{3}^{1}}{1} \times \frac{1}{\cancel{3}_{1}} = \frac{1}{1} = 1$ Cancel by dividing by 3. Finally, multiply to find the product.

Exercise 1

Multiply these fractions. Cancel and simplify if possible.

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

2. $\frac{1}{2} \times \frac{4}{5} =$

3. $\frac{3}{5} \times \frac{10}{11} =$

4. $\frac{8}{9} \times \frac{3}{4} =$

5. $\frac{7}{10} \times \frac{2}{21} =$

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

7. $\frac{5}{9} \times \frac{7}{8} =$

8. $6 \times \frac{1}{3} =$

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

10. $10 \times \frac{1}{2} =$

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

12. $\frac{15}{16} \times \frac{8}{10} =$

13. $\frac{7}{8} \times \frac{12}{13} =$

14. $\frac{6}{9} \times \frac{1}{3} =$

15. $\frac{5}{10} \times \frac{3}{4} =$

16. $\frac{16}{17} \times \frac{23}{24} =$

17. $\frac{5}{16} \times \frac{20}{30} =$

18. $\frac{9}{10} \times \frac{50}{100} =$

Multiplying Mixed Numbers

Change mixed numbers into improper fractions then multiply as before.

Ex. 1: $2\frac{1}{2} \times 3\frac{1}{3} = \frac{5}{\cancel{2}_1} \times \frac{\cancel{10}^5}{3} = \frac{25}{3} = 8\frac{1}{3}$

Change the mixed numbers to improper fractions by:

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

1) multiplying the bottom number by the whole number
2) add the top number
3) keep the bottom number.

Cancel top and bottom. Multiply. Improper fractions simplify by dividing.

Ex.2: $4\frac{1}{4} \times 6 = \frac{17}{\cancel{4}_2} \times \frac{\cancel{6}^3}{1} = \frac{51}{2} = 25\frac{1}{2}$ Change the mixed number into an improper fraction. Change the whole number into an improper fraction. Cancel. Multiply. Simplify to get the quotient.

<u>Exercise 2</u>

Multiply these fractions. Cancel and simplify if necessary.

1. $1\frac{1}{2} \times 1\frac{3}{4} =$
2. $2\frac{1}{3} \times 5\frac{2}{5} =$
3. $4\frac{1}{3} \times 1\frac{7}{8} =$
4. $\frac{1}{2} \times 2\frac{1}{8} =$
5. $3\frac{1}{4} \times \frac{7}{8} =$
6. $5\frac{5}{7} \times \frac{14}{15} =$
7. $7 \times 1\frac{3}{8} =$
8. $2\frac{4}{5} \times 5 =$
9. $6\frac{2}{3} \times 9 =$
10. $1\frac{8}{9} \times 1\frac{5}{6} =$
11. $7\frac{1}{7} \times 8\frac{2}{5} =$
12. $1\frac{1}{7} \times 9\frac{1}{3} =$

Dividing Fractions

When dividing fractions, invert (turn over) the fraction to the right of the ÷ ("divide by") symbol. Cancel (if possible) then multiply.

Ex. 1: $\frac{1}{2} \div \frac{3}{4} = \frac{1}{\cancel{2}_{1}} \times \frac{\cancel{4}^{2}}{3} = \frac{2}{3}$

Ex. 2: $\frac{3}{5} \div 5 = \frac{3}{5} \div \frac{5}{1} = \frac{3}{5} \times \frac{1}{5} = \frac{3}{25}$

<u>Exercise 3</u>

Divide these fractions. Cancel if necessary and simplify

1. $\frac{2}{3} \div \frac{5}{6} =$
2. $\frac{9}{10} \div \frac{1}{2} =$
3. $\frac{3}{4} \div \frac{1}{4} =$
4. $\frac{9}{11} \div \frac{7}{22} =$
5. $\frac{2}{5} \div \frac{1}{6} =$
6. $\frac{1}{2} \div \frac{3}{4} =$
7. $\frac{7}{8} \div \frac{1}{4} =$
8. $\frac{1}{5} \div \frac{1}{6} =$
9. $\frac{5}{8} \div \frac{15}{16} =$
10. $\frac{15}{16} \div \frac{5}{8} =$
11. $\frac{7}{12} \div \frac{3}{4} =$
12. $\frac{8}{9} \div \frac{9}{8} =$
13. $2 \div \frac{3}{8} =$
14. $6 \div \frac{1}{2} =$
15. $\frac{3}{4} \div 4 =$

Dividing Mixed Number Fractions

When dividing mixed numbers, change the mixed numbers to improper fractions, invert the fraction on the right of the ÷ symbol, cancel if possible, multiply then simplify.

Ex. 1: $2\frac{1}{2} \div 1\frac{1}{3} = \frac{5}{2} \div \frac{4}{3} = \frac{5}{2} \times \frac{3}{4} = \frac{15}{8} = 1\frac{7}{8}$

Ex. 2: $4\frac{1}{2} \div 6 = \frac{9}{2} \div \frac{6}{1} = \frac{\cancel{9}^{3}}{2} \times \frac{1}{\cancel{6}_{2}} = \frac{3}{4}$

Exercise 4

Divide the following mixed numbers. Cancel and simplify when possible.

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

2. $3\frac{1}{2} \div 1\frac{1}{8} =$

3. $5\frac{2}{5} \div 1\frac{9}{10} =$

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

5. $6\frac{4}{5} \div \frac{1}{2} =$

6. $8\frac{1}{3} \div \frac{5}{6} =$

7. $8 \div 1\frac{5}{6} =$

8. $3\frac{6}{7} \div 2 =$

9. $5\frac{7}{8} \div 4 =$

10. $3\frac{3}{7} \div 3\frac{3}{7} =$

11. $2\frac{1}{2} \div 1\frac{1}{2} =$

12. $16\frac{2}{3} \div 13\frac{1}{6} =$

Fraction Word Problems (Multiplication/Division)

When solving word problems, make sure to UNDERSTAND THE QUESTION. Look for bits of information that will help get to the answer. Keep in mind that some sentences may not have key words or key words might even be misleading. USE COMMON SENSE when thinking about how to solve word problems. The first thing you think of might be the best way to solve the problem.

Here are some KEY WORDS to look for in word problems:

Product, times: mean to multiply

Quotient, per, for each, average: mean to divide

Ex. 1: If 3 boxes of candy weigh $6\frac{1}{2}$ pounds, find the weight per box.

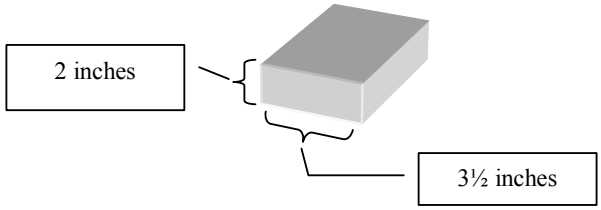
"per" means to divide

$$6\frac{1}{2} \div 3 = \frac{13}{2} \div \frac{3}{1} = \frac{13}{2} \times \frac{1}{3} = \frac{13}{6} = 2\frac{1}{6} \text{ pounds}$$

Ex. 2: If one "2 by 4" is actually $3\frac{1}{2}$ inches wide, find the width of twelve "2 by 4"s.

twelve 2" by 4"'s here means 12 times as wide as one 2" by 4"

$$3\frac{1}{2} \times 12 = \frac{7}{\cancel{2}_{1}} \times \frac{\cancel{12}^{6}}{1} = 42 \text{ inches}$$



Exercise 5

Solve the following fraction word problems. Cancel and simplify your answers.

1. A stack of boards is 21 inches high. Each board is $1\frac{3}{4}$ inches thick. How many boards are there?

2. A satellite makes 4 revolutions of the earth in one day. How many revolutions would it make in $6\frac{1}{2}$ days?

3. A bolt has $16\frac{1}{2}$ turns per inch. How many turns would be in $2\frac{1}{2}$ inches of threads?

4. If a bookshelf is $28\frac{1}{8}$ inches long, how many $1\frac{7}{8}$ inch thick books will it hold?

5. Deborah needs to make 16 costumes for the school play. Each costume requires $2\frac{1}{4}$ yards of material. How many yards of material will she need?

6. The Coffee Pub has cans of coffee that weigh $3\frac{1}{4}$ pounds each. The Pub has $8\frac{1}{2}$ cans of coffee left. What is the total weight of $8\frac{1}{2}$ cans?

7. Belinda baked 9 pies that weigh $20\frac{1}{4}$ pounds total. How much does each pie weigh?

8. A piece of paper is $\frac{4}{1000}$ inches thick. How many sheets of paper will it take to make a stack 1 inch high?

9. Tanya has read $\frac{3}{4}$ of a book, which is 390 pages. How many pages are in the entire book?

10. DJ Gabe is going to serve ⅓ of a whole pizza to each guest at his party. If he expects 24 guests, how many pizza's will he need?