Multiplying and Dividing Fractions

VANCOUVER
COMMUNITY
COLLEGE

Multiplying Fractions

To multiply two fractions, first multiply the two top numbers together. Write the answer as the top of a new fraction.

Then, multiply the bottom numbers together. Write the answer as the bottom of the new fraction.

This is your answer.

Example 1: What is $\frac{1}{2} \times \frac{3}{4}$?

Answer:	Multiply two top numbers together.	$1 \times 3 = 3$
	Multiply bottom numbers together.	$2 \times 4 = 8$
	Write the two parts as a fraction.	$\frac{3}{8}$

Some multiplication questions have answers that can be reduced. You should always reduce your answer when possible.

If one (or both) of the fractions being multiplied can be reduced, reduce first before multiplying. This will save you some work in reducing the answer.

If there are any mixed fractions, convert to improper fractions first and then multiply.

Example 2: What is $\frac{3}{6} \times \frac{2}{7}$?

Answer:	Multiply top numbers together.	$3 \times 2 = 6$
	Multiply bottom numbers together.	$6 \times 7 = 42$
	Write the two parts as a fraction.	$\frac{6}{42}$
	Is there a number that divides into the top and bottom number?	Yes
	Both 6 and 42 can be divided by 6.	$6 \div 6 = 1$ $42 \div 6 = 7$
	Perform the divisions and write the answer as a fraction.	$\frac{1}{7}$

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Practice Problems (Answers at the end)

1. $\frac{1}{2}$ × $\frac{1}{4}$ =   9. $\frac{9}{20}$ × $\frac{5}{18}$ =

2. $\frac{1}{3}$ × $\frac{2}{5}$ =   10. $\frac{6}{4}$ × $\frac{12}{15}$ =

3. $\frac{2}{3}$ × $\frac{4}{11}$ =   11. $3\frac{1}{3}$ × $\frac{1}{2}$ =

4. $\frac{5}{8}$ × $\frac{1}{10}$ =   12. $1\frac{3}{5}$ × $\frac{3}{6}$ =

5. $\frac{3}{7}$ × $\frac{2}{9}$ =   13. $\frac{4}{9}$ × $\frac{7}{6}$ =

6. $\frac{2}{7}$ × $\frac{3}{4}$ =   14. $\frac{2}{3}$ × $\frac{4}{10}$ =

7. $\frac{3}{5}$ × $\frac{5}{6}$ =   15. $\frac{1}{6}$ × $\frac{8}{24}$ =

8. $\frac{7}{10}$ × $\frac{8}{14}$ =   16. $1\frac{1}{3}$ × $\frac{9}{16}$ =

17. Helen is adapting a commercial recipe for use at home. She has decided to make 1/14 of the commercial recipe. If the commercial recipe called for ¼ cup of salt, how much salt should she use at home?

18. Tamara has decided to share half of the cookies she has left from a party (which is one-sixth of the box) with her friend Ross. How much of the box of cookies will Ross get?

19. A City Chocolate recipe calls for three-fourths of a half empty brandy bottle (1 litre). How much brandy will be needed for the City Chocolate recipe?

20. Three-fourths of the sugar cookies that Ryan made are white and two-thirds of the white cookies are cut into animal shapes. What portion of all Ryan's cookies is animal-shaped?

Dividing Fractions

Dividing fractions is very similar to multiplying fractions but with one extra step.

Extra step: First, take the second fraction and flip it so that the top number becomes the bottom number, and the bottom number becomes the top number.

Now multiply the two fractions together just like before.

Reduce the answer if possible.

Example 3: What is $\frac{1}{2} \div \frac{3}{4}$?

Answer:　　Flip the second fraction and rewrite the problem.

$$\frac{3}{4} \quad \Rightarrow \quad \frac{4}{3}$$

The problem is now: $\frac{1}{2} \times \frac{4}{3}$

Multiply top numbers together.　　　　　　　　$1 \times 4 = 4$

Multiply bottom numbers together.　　　　　　$2 \times 3 = 6$

Write the two parts as a fraction.　　　　　　　$\frac{4}{6}$

Reduce the fraction if possible.　　　　　　　　$4 \div 2 = 2$
Final answer is $^2/_3$.　　　　　　　　　　　　　$6 \div 2 = 3$

If you have a mixed fraction, remember to convert it to an improper fraction first before multiplying or dividing.

Example 4: What is $3\frac{1}{2} \div \frac{3}{4}$?

Answer:　　Flip the second fraction.

$$\frac{3}{4} \quad \Rightarrow \quad \frac{4}{3}$$

Convert the mixed fraction into an improper fraction.　　$3\frac{1}{2} = \frac{7}{2}$

Rewrite the problem　　　　　　　　　　　　　　　$\frac{7}{2} \times \frac{4}{3}$

Multiply top numbers together.　　　　　　　　　　$7 \times 4 = 28$

Multiply bottom numbers together.　　　　　　　　$2 \times 3 = 6$

Write the two parts as a fraction.　　　　　　　　　$\frac{28}{6}$

Reduce the fraction if possible.　　　　　　　　　　$28 \div 2 = 14$
　　　　　　　　　　　　　　　　　　　　　　　　$6 \div 2 = 3$

Rewrite the improper fraction as a mixed fraction.　　$\frac{14}{3} = 4\frac{2}{3}$

Practice Problems (Answers at the end)

1.	$1/2 \div 1/4 =$		9.	$9/20 \div 3/18 =$
2.	$1/3 \div 2/5 =$		10.	$6/4 \div 12/15 =$
3.	$2/3 \div 4/11 =$		11.	$3\,1/3 \div 1/3 =$
4.	$1/6 \div 3/4 =$		12.	$1\,3/5 \div 6/3 =$
5.	$3/7 \div 2/14 =$		13.	$4/9 \div 7/6 =$
6.	$2/7 \div 3/4 =$		14.	$2/3 \div 4/10 =$
7.	$3/5 \div 5/6 =$		15.	$1/6 \div 8/24 =$
8.	$7/10 \div 10/14 =$		16.	$1\,1/3 \div 16/15 =$

17. Mei has made 3 ½ oz of strawberry filling for her danishes. Each danish needs ¼ oz. of filling. How many danishes can be filled?

18. Medium pomegranates have $1/5$ lb. seeds inside. If Adam needs 3 $4/5$ lb of pomegranate seeds, how many pomegranates does he need to peel?

19. A recipe for cinnamon buns calls for cutting the dough into $2/3$ g pieces. Sam has 10 $2/3$ g sweet yeast dough, how many cinnamon buns will this yield?

20. Sara is making rye bread. Each loaf pan takes 1 ¼ lb of dough. She has made 16 ¼ lb of dough in total. How many loaves will she be able to bake?

Answers

	Multiplying Practice			Dividing Practice	
1.	$1/8$	11. $5/3 = 1\frac{2}{3}$	1.	2	11. 10
2.	$2/15$	12. $4/5$	2.	$5/6$	12. $4/5$
3.	$8/33$	13. $14/27$	3.	$11/6 = 1\frac{5}{6}$	13. $8/21$
4.	$1/16$	14. $4/15$	4.	$2/9$	14. $5/3 = 1\frac{2}{3}$
5.	$2/21$	15. $1/18$	5.	3	15. $1/2$
6.	$3/14$	16. $3/4$	6.	$8/21$	16. $5/4 = 1\frac{1}{4}$
7.	$1/2$	17. $1/56$ *cup*	7.	$18/25$	17. 14
8.	$2/5$	18. $1/12$ *box*	8.	$49/50$	18. 19
9.	$5/4 = 1\frac{1}{4}$	19. $3/8$ *litre*	9.	$27/10 = 2\frac{7}{10}$	19. 16 buns
10.	$6/5 = 1\frac{1}{5}$	20. $1/2$	10.	$15/8 = 1\frac{7}{8}$	20. 13 loaves