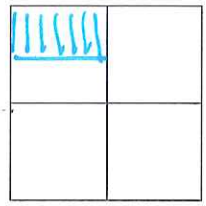
Dividing Fractions

Name Solutions

The relationship between multiplying and dividing fractions

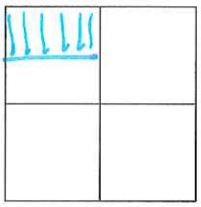
1. Divide one fourth in two and shade that region. What fraction do you have?

$\frac{1}{8}$



2. Now shade half of a fourth. What fraction do you have?

$\frac{1}{8}$



3. Problem 1 is a division problem.

$\frac{1}{4} \div 2$ or $\frac{1}{4} \div \frac{2}{1} =$ $\frac{1}{8}$

4. Problem 2 is a multiplication problem.

$\frac{1}{4} \cdot \frac{1}{2} =$ $\frac{1}{8}$

5. Dividing by 3 is the same as multiplying by what fraction?

$\frac{1}{3}$

6. Dividing by 5 is the same as multiplying by what fraction?

$\frac{1}{5}$

7. What is the relationship between dividing and multiplying fractions?

To divide by a fraction, multiply by its reciprocal

Practice dividing by multiplying by the reciprocal.

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

$\frac{2}{3} \cdot \frac{2}{1} = \frac{4}{3}$

9. $\frac{1}{3} \div \left(-\frac{1}{2}\right)$

$\frac{1}{3} \cdot \left(-\frac{2}{1}\right)$

$= -\frac{2}{3}$

10. $-\frac{3}{4} \div \frac{3}{2}$

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

$=$

11. $\frac{11}{16} \div \left(-\frac{9}{16}\right)$

$= \frac{11}{16} \cdot -\frac{16}{9}$

$= -\frac{11}{9}$

12. $-1 \div \frac{1}{4}$

$-\frac{1}{1} \cdot \frac{4}{1} = -\frac{4}{1} = -4$

13. $-\frac{1}{7} \div \left(-\frac{5}{6}\right)$

$-\frac{1}{7} \cdot -\frac{6}{5}$

$= \frac{6}{35}$

Mixed Practice

14. $\frac{7}{10} \cdot \frac{20}{21} = \frac{2}{3}$

15. $-9 \cdot \frac{1}{8} = -\frac{9}{8}$

$-\frac{9}{1} \cdot \frac{1}{8} = -\frac{9}{8}$

16. $-\frac{28}{15} \div \frac{21}{10}$

$-\frac{28}{15} \cdot \frac{10}{21}$

$= -\frac{8}{9}$

17. $-\frac{3}{4} \div 4$

$-\frac{3}{4} \cdot \frac{1}{4}$

$= -\frac{3}{16}$

For each problem, show your thinking in pictures, symbols and/or words. Show your steps and write your answer in a complete sentence.

18. A recipe calls for $\frac{3}{4}$ of a cup of flour and you are tripling the batch. How many cups of flour do you need?

×3

$\frac{3}{4} \cdot \frac{3}{1} = \frac{9}{4}$ cups

We need $\frac{9}{4}$ cups of flour.

$2\frac{1}{4}$

19. A survey found that seven-tenths of Portlanders own pets, and that two-thirds of all pet owners have dogs. What fraction of Portlanders own dogs?

$\frac{2}{3}$ of $\frac{7}{10}$

$\frac{7}{10} \cdot \frac{2}{3} = \frac{7}{15}$

$\frac{7}{15}$ of Portlanders own dogs.

20. A recipe to make 3 dozen cookies requires one-fourth of a cup of butter. How much butter should you use if you only want to make a dozen cookies? divide by 3 or multiply by $\frac{1}{3}$

$\frac{1}{4} \div 3$

or

$\frac{1}{4} \cdot \frac{1}{3} = \frac{1}{12}$

You should use 1/12 of a cup of butter.

21. How many servings are there in an 8-pound roast if the suggested serving size is $\frac{2}{3}$ pound?

large amount — individual amount

divide

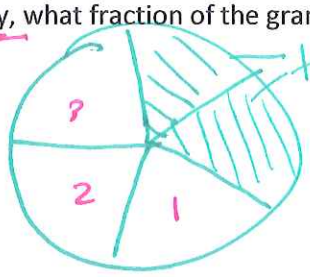
$8 \div \frac{2}{3}$

$\frac{8}{1} \div \frac{2}{3} = \frac{4}{8} \cdot \frac{3}{2} = \frac{12}{1}$ or 12

There are 12 servings.

22. Three members of the PCC math department purchased a lottery ticket and won the grand prize. If state and federal taxes combine to get two-fifths of the money, and they are going to split the remaining money equally, what fraction of the grand prize will each member receive?

divide



$\frac{3}{5} \div 3$

$\frac{3}{5} \cdot \frac{1}{3}$

$= \frac{1}{5}$

Each person would get 1/5 of the prize