Multiply and Divide Fractions and Mixed Numbers

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2.2 Multiply and Divide Fractions and Mixed Numbers

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[Figure 1]

The grade 8 students are going to plant flowers around the school. Each grade 8 class is given $6\frac{1}{2}$ flats of flowers. The grade 8 classes are then split into groups and each group is given $\frac{1}{4}$ of a flat. How many groups of grade 8 students are going out to plant flowers?

In this concept, you will learn to multiply and divide fractions and mixed numbers.

Multiplying and Dividing Fractions

To multiply two fractions, simply multiply the numerators to get the numerator of the product, and multiply the denominators to get the denominator of the product.

Let's look at an example.

Multiply: $\frac{2}{7} \times \frac{3}{5}$

First, multiply the numerators and the denominators.

$$\frac{2}{7} \times \frac{3}{5} = \frac{2 \times 3}{7 \times 5}$$
$$\frac{2}{7} \times \frac{3}{5} = \frac{6}{35}$$

The answer is $\frac{6}{35}$.

To divide two fractions, you first need to find the reciprocal of the divisor. That means that you need to flip the second fraction upside down. Then multiply the numerators and multiply the denominators.

Let's look at an example.

Divide: $4\frac{3}{10} \div \frac{1}{2}$

First, change the mixed number to an improper fraction.

$$4 \times 10 + 3 = 43$$
$$4\frac{3}{10} = \frac{43}{10}$$

Next, flip the second fraction in order to multiply.

Therefore, $\frac{1}{2}$ becomes $\frac{2}{1}$.

Then, multiply.

$$4\frac{3}{10} \div \frac{1}{2} = \frac{43}{10} \times \frac{2}{1}$$
$$= \frac{86}{10}$$

Then, simplify your answer as a mixed number.

$$\frac{86}{10} = 8\frac{6}{10}$$
$$= 8\frac{3}{5}$$

The answer is $8\frac{3}{5}$.

Examples

Example 1

Earlier, you were given a problem about the groups planting flowers around the school.

There are six and one half flats of flowers given to each grade 8 class, and each group in the grade 8 class received $\frac{1}{4}$ of a flat to plant.

Therefore, you need to divide $6\frac{1}{2} \div \frac{1}{4}$ in order to find out the number of groups in each grade 8 class.

First, change the mixed number to an improper fraction.

$$6 \times 2 + 1 = 13$$
$$6\frac{1}{2} = \frac{13}{2}$$

Next, flip the second fraction in order to multiply.

Therefore $\frac{1}{4}$ becomes $\frac{4}{1}$.

Then, multiply.

$$6\frac{1}{2} \div \frac{1}{4} = \frac{13}{2} \times \frac{4}{1}$$
$$= \frac{52}{2}$$

Then, simplify your answer.

$$\frac{52}{2} = 26$$

The answer is 26.

Therefore, there are 26 groups of grade 8 students in each class.

Example 2

$$\frac{2}{3} \times \frac{4}{6}$$

First, multiply the numerators and the denominators.

$$\frac{2}{3} \times \frac{4}{6} = \frac{2 \times 4}{3 \times 6}$$
$$\frac{2}{3} \times \frac{4}{6} = \frac{8}{18}$$

Next, reduce the fraction.

$$\frac{8}{18} = \frac{4}{9}$$

The answer is $\frac{4}{9}$.

Example 3

$$9\frac{1}{4} \div \frac{1}{3}$$

First, change the mixed number to an improper fraction.

$$9 \times 4 + 1 = 37$$
$$9\frac{1}{4} = \frac{37}{4}$$

Next, flip the second fraction in order to multiply.

Therefore $\frac{1}{3}$ becomes $\frac{3}{1}$.

Then, multiply.

$$9\frac{1}{4} \div \frac{1}{3} = \frac{37}{4} \times \frac{3}{1}$$
$$= \frac{111}{4}$$

Then, simplify your answer as a mixed number.

$$\frac{111}{4} = 27\frac{3}{4}$$

The answer is $27\frac{3}{4}$.

Example 4

$$\frac{1}{4} \times \frac{5}{6}$$

First, multiply the numerators and the denominators.

$$\frac{1}{4} \times \frac{5}{6} = \frac{1 \times 5}{4 \times 6}$$
$$\frac{1}{4} \times \frac{5}{6} = \frac{5}{24}$$

The answer is $\frac{5}{24}$.

Example 5

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

First, change the mixed number to an improper fraction.

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

Next, flip the second fraction in order to multiply.

Therefore $\frac{1}{3}$ becomes $\frac{3}{1}$.

Then, multiply.

$$2\frac{1}{2} \div \frac{1}{3} = \frac{5}{2} \times \frac{3}{1}$$
$$= \frac{15}{2}$$

Then, simplify your answer as a mixed number.

$$\frac{15}{2} = 7\frac{1}{2}$$

The answer is $7\frac{1}{2}$.

Review

Multiply the following fractions. Be sure to simplify your answer when necessary.

1. $\frac{1}{2} \times \frac{3}{4} =$ _____
2. $\frac{3}{4} \times \frac{5}{6} =$ _____
3. $\frac{1}{6} \times \frac{1}{3} =$ _____
4. $\frac{5}{6} \times \frac{10}{12} =$ _____
5. $\frac{7}{8} \times \frac{1}{3} =$ _____

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

7. $\frac{10}{11} \times \frac{2}{5} =$ _____

8. $\frac{9}{10} \times \frac{4}{6} =$ _____

9. $\frac{4}{7} \times \frac{1}{2} =$ _____

Divide the following fractions. Be sure to convert any answers of improper fractions to mixed numbers.

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

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

12. $\frac{8}{9} \div \frac{1}{2} =$ _____

13. $\frac{15}{16} \div \frac{1}{2} =$ _____

14. $\frac{8}{9} \div \frac{1}{3} =$ _____

15. $\frac{5}{10} \div \frac{1}{2} =$ _____

16. $\frac{6}{8} \div \frac{3}{4} =$ _____

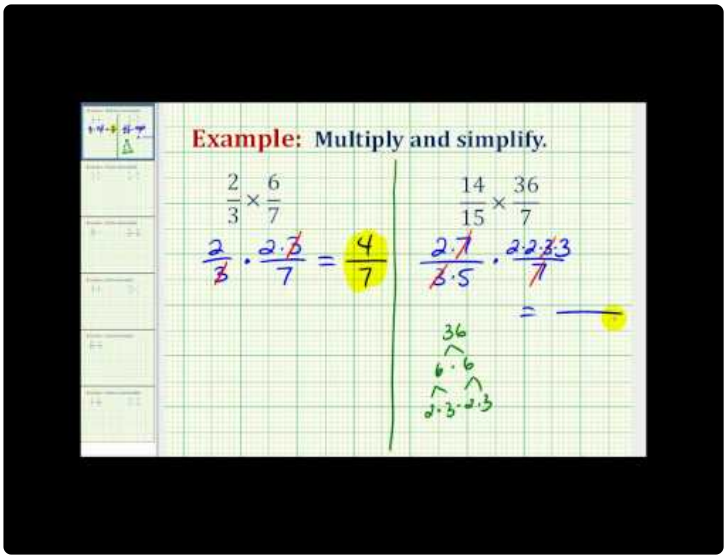
17. $\frac{6}{7} \div \frac{1}{2} =$ _____

18. $\frac{10}{12} \div \frac{1}{3} =$ _____

Review (Answers)

To see the review answers, return to the Table of Contents and select 'Other Versions' or 'Resources'.

Resources



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