3rd Grade Math: Using Multiplication and Division to Find Equivalent Fractions

What Are Equivalent Fractions?

Equivalent fractions are fractions that represent the same part of a whole, even though they may look different. They have different numerators and denominators but are equal in value.

Example:

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

All these fractions represent the same amount (half of a whole), even though the numbers are different.

Finding Equivalent Fractions Using Multiplication

To find equivalent fractions using multiplication, multiply both the **numerator** (top number) and **denominator** (bottom number) by the same number.

Steps:

1. Choose a number to multiply both the numerator and denominator by.
2. Multiply the numerator by this number.
3. Multiply the denominator by the same number.

Example 1:

Find an equivalent fraction for $\frac{3}{4}$.

- Multiply both the numerator and denominator by 2:

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

So, $\frac{3}{4}$ is equivalent to $\frac{6}{8}$.

Example 2:

Find an equivalent fraction for $\frac{5}{6}$.

- Multiply both the numerator and denominator by 3:

$$\frac{5}{6} \times \frac{3}{3} = \frac{15}{18}$$

So, $\frac{5}{6}$ is equivalent to $\frac{15}{18}$.

Finding Equivalent Fractions Using Division

To find equivalent fractions using division, divide both the numerator and denominator by the **same number** (this process is also known as simplifying a fraction).

Steps:

1. Choose a number that both the numerator and denominator can be divided by evenly (a **common factor**).
2. Divide the numerator by this number.
3. Divide the denominator by the same number.

Example 1:
Simplify the fraction $\frac{6}{12}$.

- Divide both the numerator and denominator by 6:
$$\frac{6}{12} \div \frac{6}{6} = \frac{1}{2}$$
So, $\frac{6}{12}$ is equivalent to $\frac{1}{2}$.

Example 2:
Simplify the fraction $\frac{8}{24}$.

- Divide both the numerator and denominator by 8:
$$\frac{8}{24} \div \frac{8}{8} = \frac{1}{3}$$
So, $\frac{8}{24}$ is equivalent to $\frac{1}{3}$.

Visualizing Equivalent Fractions

You can use visual aids, such as shapes or number lines, to help understand equivalent fractions.

Example with Shapes:

- Draw a rectangle and divide it into 4 equal parts. Shade 2 parts to show the fraction $\frac{2}{4}$.
- Now, divide the same rectangle into 8 parts and shade 4 of them to represent $\frac{4}{8}$.

Both fractions, $\frac{2}{4}$ and $\frac{4}{8}$, show the same shaded amount of the rectangle, demonstrating that they are equivalent.

Example with a Number Line:

- On a number line from 0 to 1, mark $\frac{1}{2}$.
- Then, divide the space between 0 and 1 into 4 equal parts and mark $\frac{2}{4}$.

You will see that $\frac{1}{2}$ and $\frac{2}{4}$ land on the same spot on the number line, showing they are equivalent.

Practice Problems

1. **Find an Equivalent Fraction**:
   Multiply $\frac{3}{5}$ by 2 to find an equivalent fraction.

   $$\frac{3}{5} \times \frac{2}{2} = \frac{6}{10}$$

   So, $\frac{3}{5}$ is equivalent to $\frac{6}{10}$.
2. **Simplify the Fraction**:
   Simplify $\frac{9}{12}$ by dividing the numerator and denominator by 3.

   $$\frac{9}{12} \div \frac{3}{3} = \frac{3}{4}$$

   So, $\frac{9}{12}$ is equivalent to $\frac{3}{4}$.
3. **Visualizing Equivalent Fractions**:
   Draw two rectangles. In the first, shade 1 part out of 2 to represent $\frac{1}{2}$. In the second, shade 2 parts out of 4 to represent $\frac{2}{4}$.
   Are these fractions equivalent?
   Answer: Yes, both $\frac{1}{2}$ and $\frac{2}{4}$ show the same amount shaded.

Conclusion

Using multiplication and division, you can easily find equivalent fractions. Multiplying both the numerator and denominator by the same number creates a fraction with the same value, just in a different form. Dividing, or simplifying, helps reduce fractions to their simplest form. Both strategies help us understand that different-looking fractions can represent the same quantity!