Name _____   Date _____
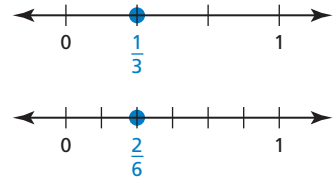
Equivalent Fractions and Simplifying Fractions

The number lines show the graphs of two fractions, $\frac{1}{3}$ and $\frac{2}{6}$. These fractions represent the same number. Two fractions that represent the same number are called **equivalent fractions**. To write equivalent fractions, you can multiply or divide the numerator and the denominator by the same nonzero number.

Example 1 Write two fractions that are equivalent to $\frac{8}{12}$.

Multiply the numerator and denominator by 2.

$$\frac{8}{12} = \frac{8 \cdot 2}{12 \cdot 2} = \frac{16}{24}$$

Divide the number and denominator by 2.

$$\frac{8}{12} = \frac{8 \div 2}{12 \div 2} = \frac{4}{6}$$

▶ Two equivalent fractions are $\frac{16}{24}$ and $\frac{4}{6}$.

A fraction is in **simplest form** when its numerator and its denominator have no common factors besides 1.

Example 2 Write the fraction $\frac{18}{24}$ in simplest form.

Divide the numerator and denominator by 6, the greatest common factor of 18 and 24.

$$\frac{18}{24} = \frac{18 \div 6}{24 \div 6} = \frac{3}{4}$$

▶ $\frac{18}{24}$ in simplest form is $\frac{3}{4}$.

Practice

Check your answers at BigIdeasMath.com.

Write two fractions that are equivalent to the given fraction.

1. $\frac{4}{10}$

2. $\frac{3}{7}$

3. $\frac{10}{15}$

4. $\frac{16}{20}$

5. $\frac{9}{30}$

6. $\frac{1}{8}$

7. $\frac{9}{16}$

8. $\frac{12}{14}$

Write the fraction in simplest form.

9. $\frac{18}{27}$

10. $\frac{3}{18}$

11. $\frac{35}{50}$

12. $\frac{14}{32}$

13. $\frac{4}{36}$

14. $\frac{48}{80}$

15. $\frac{24}{63}$

16. $\frac{33}{88}$

17. $\frac{45}{100}$

18. $\frac{60}{150}$

19. $\frac{48}{96}$

20. $\frac{110}{170}$

21. Is the fraction $\frac{45}{61}$ in simplest form? Explain.

22. Write five fractions that each simplify to one-ninth.

23. **SLEEP** It is recommended that 10- to 17-year old students should sleep about 9 hours each night. What fraction of the day is this? Write your answer in simplest form.