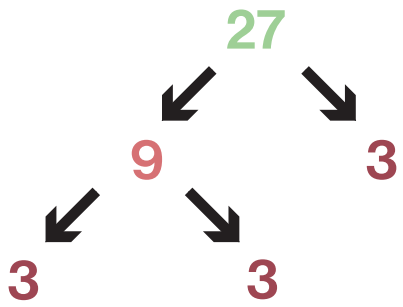
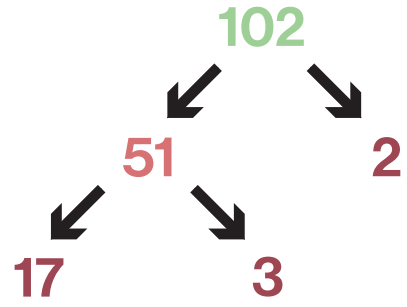
Prime Factorization Fraction Simplification

Example 1:

1. Complete the prime factorization for the numerator and denominator.





$$\frac{27}{102} \rightarrow \frac{3 \cdot 3 \cdot 3}{2 \cdot 3 \cdot 17}$$

2. Eliminate factors that are common in the numerator and denominator.

$$\frac{\cancel{3} \cdot 3 \cdot 3}{2 \cdot \cancel{3} \cdot 17} \rightarrow \frac{3 \cdot 3}{2 \cdot 17}$$

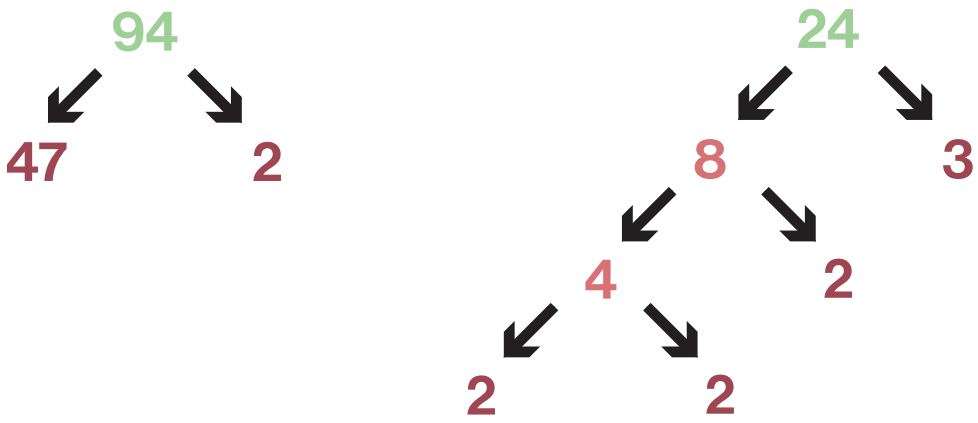
3. Multiply the remaining factors to solve for the simplified fraction.

$$\frac{3 \cdot 3}{2 \cdot 17} = \frac{9}{34}$$

Prime Factorization Fraction Simplification

Example 2:

1. Complete the prime factorization for the numerator and denominator and change variables to a multiplication format.



$$\frac{94x^2y}{24xy} \rightarrow \frac{47 \cdot 2 \cdot x \cdot x \cdot y}{2 \cdot 2 \cdot 2 \cdot 3 \cdot x \cdot y}$$

2. Eliminate factors and variables that are common in the numerator and denominator.

$$\frac{47 \cdot \cancel{2} \cdot x \cdot \cancel{x} \cdot \cancel{y}}{\cancel{2} \cdot 2 \cdot 2 \cdot 3 \cdot \cancel{x} \cdot \cancel{y}} \rightarrow \frac{47 \cdot x}{2 \cdot 2 \cdot 3}$$

3. Multiply the remaining factors and variables to solve for the simplified fraction.

$$\frac{47 \cdot x}{2 \cdot 2 \cdot 3} = \frac{47x}{12}$$