

Lesson 5-6

Example 1 Find the LCM

Find the LCM of 120 and 200.

Number	Prime Factorization	Exponential Form
120	$2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$	$2^3 \cdot 3 \cdot 5$
200	$2 \cdot 2 \cdot 2 \cdot 5 \cdot 5$	$2^3 \cdot 5^2$

The prime factors of both numbers are 2, 3, and 5. Multiply the greatest power of 2, 3, and 5 appearing in either factorization.

$$\begin{aligned}\text{LCM} &= 2^3 \cdot 3 \cdot 5^2 \\ &= 600\end{aligned}$$

So, the LCM of 120 and 200 is 600.

Example 2 The LCM of Monomials

Find the LCM of $12m^3n^5$ and $18mn^2$.

$$12m^3n^5 = 2^2 \cdot 3 \cdot m^3 \cdot n^5$$

$$18mn^2 = 2 \cdot 3^2 \cdot m \cdot n^2$$

$$\begin{aligned}\text{LCM} &= 2^2 \cdot 3^2 \cdot m^3 \cdot n^5 && \text{Multiply the greatest power of each prime factor.} \\ &= 36m^3n^5\end{aligned}$$

The LCM of $12m^3n^5$ and $18mn^2$ is $36m^3n^5$.

Example 3 Find the LCD

Find the LCD of $\frac{3}{8}$ and $\frac{7}{12}$.

$$8 = 2^3 \quad \text{Write the prime factorization of 8 and 12.}$$

$$12 = 2^2 \cdot 3$$

$$\begin{aligned}\text{LCM} &= 2^3 \cdot 3 && \text{Multiply.} \\ &= 24\end{aligned}$$

The LCD of $\frac{3}{8}$ and $\frac{7}{12}$ is 24.

Example 4 Find the LCD of Algebraic Fractions

ALGEBRA Find the LCD of $\frac{5}{18xy^2}$ and $\frac{7}{12x^3}$.

$$18xy^2 = 2 \cdot 3^2 \cdot x \cdot y^2$$

$$12x^3 = 2^2 \cdot 3 \cdot x^3$$

$$\text{LCM} = 2^2 \cdot 3^2 \cdot x^3 \cdot y^2 \text{ or } 36x^3y^2.$$

Thus, the LCD of $\frac{5}{18xy^2}$ and $\frac{7}{12x^3}$ is $36x^3y^2$.

Example 5 Compare Fractions

Replace ● with <, >, or = to make $\frac{2}{5}$ ● $\frac{3}{8}$ a true statement.

The LCD of the fractions is $2^3 \cdot 5$ or 40. Rewrite the fractions using the LCD and then compare the numerators.

$$\frac{2}{5} = \frac{2 \cdot 8}{5 \cdot 8} = \frac{16}{40} \quad \text{Multiply the fraction by } \frac{8}{8} \text{ to make the denominator 40.}$$

$$\frac{3}{8} = \frac{3 \cdot 5}{2 \cdot 2 \cdot 2 \cdot 5} = \frac{15}{40} \quad \text{Multiply the fraction by } \frac{5}{5} \text{ to make the denominator 40.}$$

Since $\frac{16}{40} > \frac{15}{40}$, then $\frac{2}{5} > \frac{3}{8}$.

