

4-7 Using the Least Common Multiple (LCM) (Pages 200–204)

A **multiple** of a number is a product of that number and any whole number. Multiples that are shared by two or more numbers are called **common multiples**. The least nonzero common multiple of two or more numbers is called the **least common multiple (LCM)** of the numbers.

Comparing Fractions	One way to compare fractions is to write equivalent fractions with the <i>same</i> denominator. The most convenient denominator to use is usually the least common multiple of the denominators, or the least common denominator (LCD) of the fractions.
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EXAMPLES

A Find the LCM of $6a^2$ and $9a$.

Find the prime factorization of each monomial.

$$6a^2 = 2 \cdot 3 \cdot a \cdot a$$

$$9a = 3 \cdot 3 \cdot a$$

Find the common factors. Then multiply all of the factors, using the common factors only once.

$$2 \cdot 3 \cdot 3 \cdot a \cdot a = 18a^2$$

So the LCM of $6a^2$ and $9a$ is $18a^2$.

B Compare $\frac{11}{12}$ and $\frac{13}{16}$.

$12 = 2 \cdot 2 \cdot 3$ and $16 = 2 \cdot 2 \cdot 2 \cdot 2$, so the LCM of the denominators, or LCD, is $2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$ or 48.

Find equivalent fractions with 48 as the denominator.

$$\frac{11 \times 4}{12 \times 4} = \frac{44}{48} \quad \frac{13 \times 3}{16 \times 3} = \frac{39}{48}$$

$$\text{Since } \frac{44}{48} > \frac{39}{48}, \frac{11}{12} > \frac{13}{16}.$$

Try These Together

1. Find the LCM of $8x$ and $6y$.

HINT: Begin by finding the prime factorization of each number.

2. Compare $\frac{4}{7}$ and $\frac{2}{3}$.

HINT: Write equivalent fractions using the LCM of 7 and 3.

PRACTICE

Find the LCM of each set of numbers or algebraic expressions.

3. 10, 2

4. $14, 4$

5. $2b, 8b$

6. $12t, 8t$

7. $22m, 11n$

8. 5, 4, 3

9. $15a^2, 3a^3$

10. $2x, 10xy, 3z$

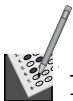
First find the LCD for each pair of fractions. Then replace the ● with <, >, or = to make a true statement.

11. $\frac{3}{4} \bullet \frac{5}{8}$

12. $\frac{1}{10} \bullet \frac{2}{12}$

13. $\frac{6}{7} \bullet \frac{4}{5}$

14. $\frac{5}{9} \bullet \frac{11}{21}$



15. Standardized Test Practice What is the LCM of 2, 8, and 6?

A 2

B 14

C 24

D 48

Answers: 1. 24xy 2. $\frac{3}{4} > \frac{7}{4}$ 3. 10 4. 28 5. 8b 6. 24t 7. 22mn 8. 60 9. $30a^3$ 10. $30xyz$ 11. 8. > 12. 60. > 13. 36. > 14. 63. < 15. C