8.5 Add and Subtract Rational Expressions

$$Add \frac{7}{20} + \frac{9}{20} = \frac{7+9}{20} = \frac{16}{20} = \frac{4 \cdot 4}{4 \cdot 5} = \boxed{4}$$

Find the least common multiple of 20 and 45.

5.2.3

5.4.9

30.9

$$\frac{4.5}{4.18} + \frac{31}{72}$$

Add $\frac{5}{18} + \frac{31}{72}$
 $\frac{20}{72} + \frac{31}{72} = \frac{51}{72} = \frac{5.17}{5.24} = \frac{17}{24}$

EXAMPLE 1 Add or subtract with like denominators

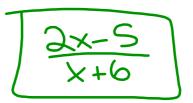
Perform the indicated operation.

a.
$$\frac{7}{4x} + \frac{3}{4x}$$

$$\frac{7+3}{4x}$$

$$\frac{10}{4x} = \frac{5}{2x}$$

b.
$$\frac{2x}{x+6} - \frac{5}{x+6}$$



EXAMPLE 2 Find a least common multiple (LCM)

Find the least common multiple of $4x^2 - 16$ and $6x^2 - 24x + 24$.

That the least common multiple of
$$4(x^2-4)$$

$$4(x-2)(x+2)$$

$$3\cdot 2^{3}(x-2)(x+2)$$

$$3\cdot 2^{3}(x-2)(x+2)$$

$$6x^{2}-24x+24$$
 $6(x^{2}-4x+4)$
 $6(x-2)(x-2)$
 $6(x-2)^{2}$
 $2(3(x-2)^{2}$

EXAMPLE 3 Add with unlike denominators

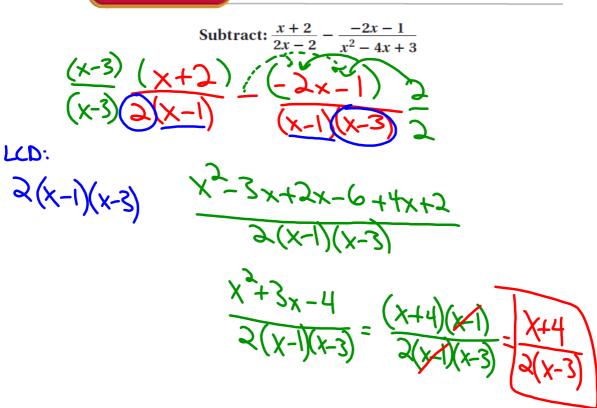
Add:
$$\frac{7}{9x^{2}} + \frac{x}{3x^{2} + 3x} \rightarrow 3x(x+1)$$

$$\frac{(x+1)}{3} \xrightarrow{3} \xrightarrow{2} + \frac{3}{3x}(x+1) - 3x$$

$$\frac{3}{3} \xrightarrow{2} (x+1) = \frac{3}{3} \xrightarrow{2} (x+1)$$

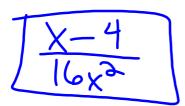
$$\frac{7}{3} \xrightarrow{2} (x+1) = \frac{3}{3} \xrightarrow{2} (x+1)$$

EXAMPLE 4 Subtract with unlike denominators



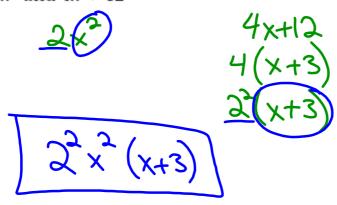
LIKE DENOMINATORS Perform the indicated operation and simplify.

4.
$$\frac{x}{16x^2} - \frac{4}{16x^2}$$



FINDING LCMS Find the least common multiple of the polynomials.

10. $2x^2$ and 4x + 12



UNLIKE DENOMINATORS Perform the indicated operation and simplify.

$$16. \frac{12}{5x} + \frac{7}{6x} = \frac{6}{6} \cdot \frac{12}{6x} + \frac{5}{5} \cdot \frac{7}{6x}$$

$$LCD:523x = \frac{72}{30x} + \frac{35}{30x}$$

$$30x = \frac{107}{30x}$$