Warm-up:

Subtract

$$\frac{5}{x-2} - \frac{2x+5}{x+1}$$

6. Calculate each sum or difference. Make sure to list the restrictions for the variable, and rewrite in lowest terms.

a. $\frac{5x-6}{x^2-9} - \frac{4}{x-3}$

b. $\frac{x-7}{x^2-3x+2} + \frac{4}{x^2-7x+10}$

c. $\frac{2x-5}{x} - \frac{4}{5x} - 4$

d. $\frac{3x-5}{4x^2+12x+9} + \frac{4}{2x+3} - \frac{2x}{3}$

e. $\frac{x+2}{x-4} + \frac{2}{x} + \frac{5}{3x-1}$

3. Analyze Isha's work. Explain how Isha could have multiplied the rational expressions more efficiently.

Isha

$$\frac{12xyz^2}{11} \cdot \frac{33x}{8z} = \frac{\overset{9}{\cancel{396}}x^2y\overset{z}{\cancel{z^2}}}{\underset{2}{\cancel{88z}}}$$

$$= \frac{9x^2yz}{2}$$

4. **Shaheen multiplies $\frac{5x^2}{3x^2 - 75} \cdot \frac{3x - 15}{4x^2}$ without dividing out factors first. Complete the same problem as Shaheen, by dividing out common factors first, and then list the restrictions.**

Shaheen

$$\frac{5x^2}{3x^2 - 75} \cdot \frac{3x - 15}{4x^2} = \frac{15x^3 - 75x^2}{12x^4 - 300x^2}$$

$$= \frac{15x^2(x - 5)}{3x^2(4x^2 - 100)}$$

$$= \frac{15x^2(x - 5)}{3x^2(4x^2 - 100)}$$

$$= \frac{5(x - 5)}{4(x^2 - 25)}$$

$$= \frac{5(x - 5)}{4(x - 5)(x + 5)}$$

$$= \frac{5}{4(x + 5)}$$

5. Multiply each expression. List the restrictions for the variables.

a. $\frac{3ab^2}{4c} \cdot \frac{2c^2}{27\,ab}$

b. $\frac{3x}{5x - 15} \cdot \frac{x - 3}{9x^2}$

c. $\frac{x+5}{x^2-4x+3} \cdot \frac{x-3}{4x+20}$

d. $\frac{7x-7}{3x^2} \cdot \frac{x+5}{9x^2-9} \cdot \frac{x^2-5x-6}{x^3+6x^2+5x}$

Make sure to list the restrictions for the variables.

2. Determine the quotients of each expression.

a. $\frac{9ab^2}{4c} \div \frac{18c^2}{5ab}$

b. $\frac{7x^2}{3x^2 - 27} \div \frac{4x^2}{3x - 9}$

c. $\dfrac{3x^2 + 15x}{x^2 - 3x - 40} \div \dfrac{5x^2}{x^2 - 64}$