Multiplying and Dividing Rational Expressions

1. State the domain of each rational expression:

$$\frac{3x-1}{x^2-6x-40}$$

2. State the domain of each rational expression:

$$\frac{x^2+3x-5}{5x^2-12x+7}$$

3. State the domain of each rational expression:

$$\frac{x-3}{x^2+9}$$

4. Simplify each rational expression:

$$\frac{a^2-10a+16}{a-2}$$

5. Simplify each rational expression:

$$\frac{w^2-5w-50}{w^2-2w-35}$$

6. Simplify each rational expression:

$$\frac{9-k^2}{k^2+11k+24}$$

7. Simplify each rational expression:

$$\frac{v^3-7v^2-3v+21}{v^2-14v+49}$$

8. Multiply and simplify each rational expression:

$$\frac{3x^7}{x+8}\cdot\frac{x^2+12x+32}{12x^2}$$

9. Multiply and simplify each rational expression:

$$\frac{5x^2+8x-21}{x^2-6x-27}\cdot\frac{x^2+4x-32}{5x^2-27x+28}$$

10. Multiply and simplify each rational expression:

$$\frac{2y^2-13y+15}{4y^2-8y+3}\cdot\frac{6y^2+y-2}{5-y}$$

11. Multiply and simplify each rational expression:

$$\frac{p^2-9p+14}{p^2-12p+35}\cdot(p-5)$$

12. Divide each rational expression. Simplify the quotient, if possible:

$$\frac{\dfrac{x^2-14x+48}{2x^2-7x+5}}{\dfrac{x^2-64}{x^2+7x-8}}$$