

1. Simplify this rational expression. State restrictions on the variable.

$$\frac{8x^5 - 72x^3}{10x^3 - 20x^2 - 150x}$$

Simplify each product or quotient. State restrictions on the variable.

2. $\frac{x^2 + 8x + 16}{6x^3 + 18x^2 - 24x} \cdot \frac{3x - 3}{x^2 - 16}$

3. $\frac{x^2 + 3x - 10}{2x^2 + x - 3} \div \frac{x^3 + 5x^2 - 4x - 20}{x^2 + x - 2}$

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1. Simplify this rational expression. State restrictions on the variable.

$$\frac{8x^5 - 72x^3}{10x^3 - 20x^2 - 150x}$$

$$8x^5 - 72x^3 = 8x^3(x^2 - 9) = 8x^3(x+3)(x-3)$$

$$10x^3 - 20x^2 - 150x = 10x(x^2 - 2x - 15) = 10x(x-5)(x+3)$$

$$x \neq 0, 5, -3$$

ANSWERS

$$= \frac{8x^3(x+3)(x-3)}{10x(x-5)(x+3)}$$

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

Simplify each product or quotient. State restrictions on the variable.

2. $\frac{x^2 + 8x + 16}{6x^3 + 18x^2 - 24x} \cdot \frac{3x - 3}{x^2 - 16}$

$$= \frac{(x+4)(x+4)}{6x(x+4)(x-4)} \cdot \frac{3(x-1)}{(x+4)(x-4)}$$

$$= \frac{1}{2x(x-4)}$$

$$x \neq 0, 1, \pm 4$$

$$\begin{array}{c|c} x+5 & \\ \hline x^2 & x^3 + 5x^2 \\ -4 & -4x - 20 \end{array}$$

3. $\frac{x^2 + 3x - 10}{2x^2 + x - 3} \div \frac{x^3 + 5x^2 - 4x - 20}{x^2 + x - 2}$

$$= \frac{(x+5)(x-2)}{(2x+3)(x-1)} \div \frac{(x+5)(x+2)(x-2)}{(x+2)(x-1)}$$

$$= \frac{(x+5)(x-2)}{(2x+3)(x-1)} \cdot \frac{(x+2)(x-1)}{(x+5)(x+2)(x-2)}$$

$$= \frac{1}{2x+3}$$

$$x \neq -\frac{3}{2}, 1, \pm 2$$