

Practice Problems

1. Express each of the following products in simplest form.

$$(a) \frac{12x^4 \cdot 15y}{5y^8 \cdot 30x^2}$$

$$\frac{180x^4y^1}{150x^2y^8} = \frac{6}{5}x^{4-2}y^{1-8}$$

$$= \frac{6x^2}{5y^7}$$

$$(b) \frac{14a^2 \cdot 10b^3}{15b^9 \cdot 21a^6}$$

$$\frac{140a^2b^3}{315a^6b^9}$$

$$\frac{4}{9}a^{2-6}b^{3-9}$$

$$\frac{4}{904b^6}$$

$$(c) \frac{4x^3 \cdot 3y^7 \cdot 30z^2}{9z^5 \cdot 10x^2 \cdot 8y^3}$$

$$\frac{360x^3y^7z^2}{720x^2y^3z^5}$$

$$\frac{xy^4}{2z^3}$$

2. Write each of the following products in simplest form.

$$(a) \frac{9x^2-16}{12x+16} \cdot \frac{8x+8}{3x^2-x-4}$$

*Quadratic
a=3 b=-1 c=-4*

$$\frac{(3x-4)(3x+4)}{4(3x+4)} \cdot \frac{8(x+1)}{(3x-4)(x+1)}$$

$$\frac{8}{4} = \boxed{2}$$

$$(b) \frac{x^2-x-12}{x^2+8x+15} \cdot \frac{x^2+2x-15}{16-x^2}$$

$$\frac{(x-4)(x+3)}{(x+3)(x+5)} \cdot \frac{(x+5)(x-3)}{(4-x)(4+x)}$$

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

OR

$$= \frac{-x+3}{4+x}$$

$$(c) \frac{2x^2+7x-4}{8x^3-4x^2} \cdot \frac{12x^2-24x}{x^2+6x+8}$$

$$\frac{(2x-1)(x+4)}{4x^2(2x-1)} \cdot \frac{12x(x-2)}{(x+2)(x+4)}$$

$$\frac{12x(x-2)}{4x^2(x+2)} = \frac{3 \cdot 4x(x-2)}{4 \cdot x \cdot x(x+2)}$$

$$= \frac{3(x-2)}{x(x+2)} \text{ OR}$$

$$= \frac{3x-6}{x^2+2x}$$

$$(d) \frac{x^2-7x-8}{1-x^2} \cdot \frac{3x^2-4x+1}{9x^2-1}$$

$$\frac{(x-8)(x+1)}{(1-x)(1+x)} \cdot \frac{(3x-1)(x-1)}{(3x-1)(3x+1)}$$

$$\frac{(x-8)(x-1)}{(1-x)(3x+1)} = \frac{(x-8)}{(1-x)} \cdot \frac{1(1-x)}{(3x+1)}$$

$$= \frac{-1(x-8)}{3x+1} \text{ OR}$$

$$= \frac{-x+8}{3x+1}$$

3. When $\frac{24x^{10}}{2y}$ is divided by $\frac{36x^2}{6y^8}$ the result is $\frac{24x^{10}}{2y} \div \frac{36x^2}{6y^8} \Rightarrow \frac{24x^{10}}{2y} \times \frac{6y^8}{36x^2}$

(1) $2x^8y^7$

(3) $\frac{x^8}{3y^7}$

(2) $\frac{3x^5}{2y^7}$

(4) $\frac{x^4}{2y^7}$

$\frac{144x^{10}y^8}{72x^2y} = 2x^8y^7$

4. Express the result of each division problem below in simplest form.

(a) $\frac{5x^3-10x^2}{10x^2+40x} \div \frac{x^2-5x+6}{x^2+x-12}$

$\frac{5x^2-10x}{10x^2+40x} \cdot \frac{x^2+x-12}{x^2-5x+6}$
 $\frac{5x^2(x-2)}{10x(x+4)} \cdot \frac{(x+4)(x-3)}{(x-2)(x-3)}$
 $\frac{5x^2}{10x} = \boxed{\frac{x}{2}}$

(b) $\frac{24-18x}{9x^2-16} \div \frac{2x^2+2x}{3x^2+7x+4}$

$\frac{24-18x}{9x^2-16} \cdot \frac{3x^2+7x+4}{2x^2+2x}$
 $\frac{6(4-3x)}{(3x-4)(3x+4)} \cdot \frac{(3x+4)(x+1)}{2x(x+1)}$
 $\frac{6 \cdot -1(3x-4)}{(3x-4)} \cdot \frac{1}{2x} = \frac{-6}{2x} = \boxed{\frac{-3}{x}}$

(c) $\frac{x^2-6x+8}{3x^4-6x^3} \div \frac{4x^2-1}{2x^3-x^2}$

$\frac{x^2-6x+8}{3x^4-6x^3} \cdot \frac{2x^3-x^2}{4x^2-1}$
 $\frac{(x-4)(x-2)}{3x^3(x-2)} \cdot \frac{x^2(2x-1)}{(2x-1)(2x+1)}$
 $\frac{(x-4)}{3x \cdot x \cdot x} \cdot \frac{x \cdot x}{(2x+1)} = \frac{x-4}{3x(2x+1)}$
 or
 $\frac{x-4}{6x^2+3x}$

(d) $\frac{49-x^2}{x^2-9x+14} \div \frac{x^2+2x-35}{6-3x}$

$\frac{49-x^2}{x^2-9x+14} \cdot \frac{6-3x}{x^2+2x-35}$
 $\frac{(7+x)(7-x)}{(x-7)(x-2)} \cdot \frac{3(2-x)}{(x+7)(x-5)}$
 $\frac{-1(x-7)}{(x-7)(x-2)} \cdot \frac{3 \cdot -1(x-2)}{(x-5)}$
 $\boxed{\frac{3}{(x-5)}}$