

Homework Help 8.3 p. 388

$$31. \left(\frac{4a}{b^5}\right)^2 = \frac{4^2 a^2}{(b^5)^2} = \frac{16a^2}{b^{10}}$$

$$37. \left[\frac{p^4 q^7}{(pq)^3}\right]^4 = \left[\frac{p^4 q^7}{p^3 q^3}\right]^4 = [p^1 q^4]^4 \\ = (p^1)^4 (q^4)^4 \\ = p^4 q^{16}$$

$$38. \left(\frac{6x}{24x^4}\right)^2 = \left(\frac{1}{4x^3}\right)^2 = \frac{(1)^2}{(4)^2 (x^3)^2} \\ = \frac{1}{16x^6} \\ \frac{36x^2}{576x^{8-2}} = \frac{1}{16x^6}$$

$$54. \frac{0.08r^{12}}{0.004r^3} = 20r^9$$

$$\frac{0.080 \cdot \frac{1000}{1000}}{0.004 \cdot \frac{1000}{1000}} = \frac{80}{4} = 20$$

$$\frac{0.80}{0.04} = \frac{80}{4}$$

Practice

$$a. \frac{3.20x^5}{0.08x^9} = \frac{320}{8} \rightarrow \frac{40}{x^4}$$

$$b. \frac{2.6x^3}{1.4x^{10}} = \frac{26}{14} = \frac{13}{7} \\ \frac{13}{7x^7}$$

## Sec. 8.4 Negative and Zero Exponents

Negative Exponent

$$x^{-n} = \frac{1}{x^n}$$

$$\frac{a \cdot a \cdot a}{a \cdot a \cdot a} = 1$$

↓

$$\frac{a^3}{a^3} = a^{3-3} = a^0 = 1$$

$$\frac{a^3}{a^7} = a^{3-7} = a^{-4}$$

$$\frac{\overset{||}{a} \cdot \overset{||}{a} \cdot \overset{||}{a}}{\overset{||}{a} \cdot \overset{||}{a} \cdot \overset{||}{a} \cdot \overset{||}{a} \cdot \overset{||}{a} \cdot \overset{||}{a}} = \frac{1}{a^4}$$

zero as an Exponent

$$x^0 = 1$$

Evaluate each expression

a.  $3^5 \cdot 3^{-7} = 3^{5+(-7)} = 3^{-2} = \frac{1}{3^2}$

b.  $\frac{5^2}{5^{-2}} = 5^{2-(-2)} = 5^{2+2} = 5^4 = 625$

↳  $\frac{5^2}{5^{-2}} = 5^2 \cdot 5^2 = 5^{2+2} = 5^4 = 625$

c.  $\frac{4^4}{4^7} = 4^{4-7} = 4^{-3} = \frac{1}{4^3} = \frac{1}{64}$

↳

$$\frac{1}{4^{7-4}} = \frac{1}{4^3}$$