

8.2: Apply exponent properties using quotients

$$\frac{a^5}{a^3} = \frac{\cancel{a} \cdot \cancel{a} \cdot \cancel{a} \cdot a \cdot a}{\cancel{a} \cdot \cancel{a} \cdot \cancel{a}} = a^2$$

quotient of powers property:

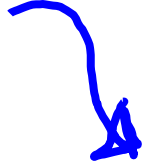
$$\frac{a^m}{a^n} = a^{m-n} \quad \text{ex. } \frac{\underline{4^7}}{\underline{4^2}} = \frac{4^{7-2}}{4^5}$$

on your own:

$$a) \frac{8^{10}}{8^4} = 8^6$$

$$b) \frac{(-3)^9}{(-3)^3} = (-3)^6$$

$$c) \frac{5^4 \cdot 5^8}{5^7}$$

$$\frac{5^{12}}{5^7}$$


$$5^5$$

$$d) \frac{1}{x^4} \cdot \frac{x^6}{1}$$

$$\frac{x^6}{x^4} = x^2$$

Power of a quotient property

$$\left(\frac{a}{b}\right)^4 = \frac{a \cdot a \cdot a \cdot a}{b \cdot b \cdot b \cdot b} = \frac{a^4}{b^4}$$

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

example: $\left(\frac{3}{2}\right)^7 = \frac{3^7}{2^7}$

on your own:

$$a) \left(\frac{x}{y}\right)^3$$

$$\frac{x^3}{y^3}$$

$$b) \left(\frac{-7}{x}\right)^2$$

$$\frac{49}{x^2}$$

More examples:

$$\textcircled{1} \left(\frac{4x^2}{5y} \right)^3 = \frac{4^3 x^{\cancel{6}6}}{5^3 y^3} = \frac{64x^6}{125y^3}$$

$$\textcircled{2} \left(\frac{a^2}{b} \right)^5 \cdot \frac{1}{2a^2} = \frac{a^{10}}{b^5} \cdot \frac{1}{2a^2}$$

$$\frac{a^{10}}{2a^2 b^5} = \frac{a^8}{2b^5}$$

on your own:

$$a) \left(\frac{a}{b}\right)^2 = \frac{a^2}{b^2}$$

$$b) \left(-\frac{5}{y}\right)^3 = \frac{-125}{y^3}$$

$$c) \left(\frac{x^2}{4y}\right)^3$$

$$\frac{x^4}{16y^2}$$

$$d) \left(\frac{2s}{3t}\right)^3 \cdot \left(\frac{t^5}{16}\right)$$

$$\frac{8s^3}{27t^3} \cdot \frac{t^5}{16}$$
$$\frac{8s^3 t^5}{27t^3 \cdot 16} = \frac{8s^3 t^2}{27 \cdot 16 \cdot 2} = \frac{s^3 t^2}{54}$$

$$\left(\frac{3a^4}{5b}\right)^3 = \frac{27a^{12}}{125b^3}$$

$$\left(\frac{x^3}{y}\right)^7 \cdot \frac{1}{3x^8} = \frac{x^{21}}{y^7} \cdot \frac{1}{3x^8} = \frac{x^{13}}{3x^8y^7}$$

$$\frac{x^{13}}{3y^7}$$

