



6. Simplify and give your answers with positive exponents:

$$\begin{aligned} \text{a) } \sqrt{9x^7} \times 6x^2y^{-2} \times \frac{1}{2}x^{-5}y^{-2} &= 3x^{7/2} \cdot 6x^2y^{-2} \cdot \frac{1}{2}x^{-5}y^{-2} \\ &= 9x^{1/2}y^{-4} = \frac{9x^{1/2}}{y^4} \end{aligned}$$

$$\text{b) } \left(\frac{15x^{-3}y^5}{6x^{-5}y^{-2}}\right)^{-3} = \left(\frac{5}{2}x^2y^7\right)^{-3} = \left(\frac{5}{2}\right)^{-3}x^{-6}y^{-21} = \left(\frac{2}{5}\right)^3x^{-6}y^{-21} = \frac{8}{125x^6y^{21}}$$

$$\text{c) } \frac{(8x^{-2}y^3)^{-2/3}}{(64x^{-6}y^{-6})^{1/6}} = \frac{8^{-2/3}x^{4/3}y^{-2}}{64^{1/6}x^{1/6}y^{-1}} = \frac{x^{4/3} \cdot x^{-1/6}}{2 \cdot 8^{2/3}y^{-1}y^2} = \frac{x^{7/6}}{8y}$$

$$\text{d) } \frac{(2x^3y^{-3})^{-4} \times 5x^2y^{-3}}{10x^{-5}y^{-7}} = \frac{2^{-4}x^{-12}y^{12} \times 5x^2y^{-3}}{10x^{-5}y^{-7}} = \frac{x^{-10}y^9}{2^5x^{-5}y^{-7}} = \frac{y^{16}}{32x^5}$$

$$\begin{aligned} \text{e) } \frac{\left(\frac{2}{3}x^5y^{-7}\right)^{-3}}{\left(\frac{3}{4}x^{-2}y^4\right)^4} &= \frac{\left(\frac{2}{3}\right)^{-3}x^{-15}y^{21}}{\left(\frac{3}{4}\right)^4x^{-8}y^{16}} = \frac{\left(\frac{3}{2}\right)^3x^{-15}y^{21}}{\left(\frac{3}{4}\right)^4x^{-8}y^{16}} = \frac{4^4 \cdot 3^3 x^{-15} y^{21}}{2^3 \cdot 3^4 x^{-8} y^{16}} = \frac{2^8 2^{-3} y^{21} y^{-16}}{3^4 3^{-3} x^{15} x^{-8}} \\ &= \frac{2^5 y^5}{3 \cdot x^7} = \frac{32y^5}{3x^7} \end{aligned}$$

$$\text{f) } \left(\frac{8x^{-5}y^{10}}{12x^3y^{-2}}\right)^{-2} = \left(\frac{2y^{12}}{3x^8}\right)^{-2} = \left(\frac{3x^8}{2y^{12}}\right)^2 = \frac{9x^{16}}{4y^{24}}$$