

1. Simplify the following and express your answer as a single number (as an improper fraction if necessary).

(a) (2 points) $\frac{2^2 \cdot (8^3)^3}{(4^2 \cdot 2^4)^2 \cdot 2^7}$

(b) (2 points) $\left(\frac{35}{3}\right)^6 \cdot \frac{27^2}{25^3} \cdot \left(\frac{6}{7^3}\right)^2$

(c) (2 points) $\left(\frac{11}{3^{-1} \cdot 49}\right)^{-4} \cdot \left(\frac{33}{12^2}\right)^{-3} \div \left(\frac{50^2}{11^3}\right)^2 \cdot \left(\frac{14^4}{11 \cdot 5^4}\right)^{-2}$

2. Simplify the following and express your answer in positive index form.

(a) (2 points) $b^{-19} \cdot (b^{-3})^{-5} \cdot \left(\frac{1}{b^{-2}}\right)^4$

(b) (2 points) $\frac{p^2 q^{-3}}{(p^2 q^3)^5} \cdot ((pq^3)^{-2})^{-3} \cdot \left(\frac{p^3 \cdot q^{-1}}{p^2}\right)^3$

(c) (2 points) $\frac{\frac{(fg^2)^3 \cdot f^{-6}}{(gf)^{-3}} \cdot \left(\frac{fg^2}{(g^{-1})^{-2}}\right)^3}{\frac{(f^{-1}g)^4 (g^2 f)^2}{g^{-2}} \div \frac{g^{-5}}{(gf)^2}}$