

Name:

Date:

Period:

Practice LG 4.1: Rational Exponents

Simplify with only **positive** exponents

a) 3^{-3}

Flip negative exponents

$$\frac{1}{3^3} = \boxed{\frac{1}{27}}$$

b) $(6c)^{-2}$

$$\frac{1}{(6c)^2} = \frac{1}{6^2 c^2} = \boxed{\frac{1}{36c^2}}$$

c) $\left(\frac{1}{b^{-12}b^{-3}}\right)^{\frac{2}{3}}$

↓ Both negative, so bring both up

$$(b^{12}b^3)^{\frac{2}{3}}$$

↘ Add exponents inside

$$(b^{15})^{\frac{2}{3}}$$

↘ Distribute exponent

$$\boxed{b^{10}}$$

d) $(25p^6q^8r^{10})^{-\frac{1}{2}}$

↙ factor 25 first → 5^2

$$(5^2 p^6 q^8 r^{10})^{-\frac{1}{2}} =$$

$$5^{-1} p^{-3} q^{-4} r^{-5} = \text{Distribute the exponent}$$

$$\frac{1}{5p^3q^4r^5}$$

Bring all negative exponents down and make positive

$$e) 2^{-5} =$$

$$\frac{1}{2^5} = \frac{1}{32}$$

$$f) (3b)^{-3}$$

$$\frac{1}{(3b)^3} = \frac{1}{3^3 b^3} = \frac{1}{27b^3}$$

$$g) (81p^2q^{10}r^{14})^{-\frac{1}{2}}$$

$$(3^4 p^2 q^{10} r^{14})^{-1/2}$$

$$3^{-2} p^{-1} q^{-5} r^{-7} =$$

$$\frac{1}{3^2 p^1 q^5 r^7} = \frac{1}{9pq^5r^7}$$

$$\begin{array}{c} 81 \\ / \quad \backslash \\ 9 \quad 9 \\ / \quad \backslash \quad / \quad \backslash \\ 3 \quad 3 \quad 3 \quad 3 \end{array}$$

$$h) \left(\frac{x^{20}}{x^{-5}}\right)^{\frac{3}{5}} = (x^{20} \cdot x^5)^{\frac{3}{5}}$$

$$= (x^{25})^{\frac{3}{5}}$$

$$= x^5$$