

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Learning Goal 5.2**

Use exponent laws to evaluate expression with positive and negative rational exponents.

Evaluate each power without using a calculator.

$$\begin{aligned} \text{a. } 1000^{1/3} &= \sqrt[3]{1000} \\ &= 10 \end{aligned}$$

$$\begin{aligned} \text{b. } 0.25^{1/2} &= \sqrt{\frac{1}{4}} \\ &= \frac{1}{2} \end{aligned}$$

$$\begin{aligned} \text{c. } \left(\frac{16}{81}\right)^{1/4} &= \sqrt[4]{\frac{16}{81}} \\ &= \frac{2}{3} \end{aligned}$$

Simplify.

$$\begin{aligned} \text{a. } 0.01^{3/2} &= \left(\frac{1}{100}\right)^{3/2} \\ &= \left(\sqrt{\frac{1}{100}}\right)^3 \\ &= \left(\frac{1}{10}\right)^3 \\ &= \frac{1}{1000} \end{aligned}$$

$$\begin{aligned} \text{b. } (-27)^{4/3} &= \left(\sqrt[3]{-27}\right)^4 \\ &= (-3)^4 \\ &= 81 \end{aligned}$$

$$\begin{aligned} \text{c. } 81^{-3/4} &= \left(\frac{1}{81}\right)^{3/4} \\ &= \left(\sqrt[4]{\frac{1}{81}}\right)^3 \\ &= \left(\frac{1}{3}\right)^3 \\ &= \frac{1}{27} \end{aligned}$$

$$\begin{aligned} \text{d. } 0.75^{1.2} &= \left(\frac{75}{100}\right)^{6/5} \\ &= \left(\frac{3}{4}\right)^{6/5} \\ &= \sqrt[5]{\left(\frac{3}{4}\right)^6} \\ &= \frac{3}{4} \sqrt[5]{\frac{3}{4}} \end{aligned}$$

$$\begin{aligned} \text{e. } (-32)^{-0.4} &= (-32)^{-2/5} \\ &= \left(-\frac{1}{32}\right)^{2/5} \\ &= \left(\sqrt[5]{-\frac{1}{32}}\right)^2 \\ &= \left(-\frac{1}{2}\right)^2 \\ &= \frac{1}{4} \end{aligned}$$

$$\begin{aligned} \text{f. } 1.8^{-1.4} &= \left(\frac{9}{5}\right)^{-7/5} \\ &= \left(\frac{5}{9}\right)^{7/5} \\ &= \sqrt[5]{\left(\frac{5}{9}\right)^7} \\ &= \frac{5}{9} \sqrt[5]{\left(\frac{5}{9}\right)^2} \\ &= \frac{5}{9} \sqrt[5]{\frac{25}{81}} \end{aligned}$$