

INDEPENDENT PRACTICE

1) Simplify without a calculator. I would encourage you to change the expressions to radicals.

11 a. $125^{1/3} = \sqrt[3]{125} = 5$ b. $64^{-1/2} = (8^2)^{-1/2} = 8^{-1} = \frac{1}{8}$ c. $64^{1/6} = (2^6)^{1/6} = 2$

d. $81^{1/2} = (9^2)^{1/2} = 9$ e. $32^{-1/5} = (2^5)^{-1/5} = 2^{-1} = \frac{1}{2}$ f. $81^{-1/4} = (3^4)^{-1/4} = 3^{-1} = \frac{1}{3}$

g. $4^{3/2} = (2^2)^{3/2} = 2^3 = 8$ h. $(-64)^{2/3} = (-2^6)^{2/3} = -2^4 = -16$ i. $(-8)^{-5/3} = (-2^3)^{-5/3} = -2^{-5} = -\frac{1}{32}$

j. $9^{-3/2} = (3^2)^{-3/2} = 3^{-3} = \frac{1}{27}$ k. $\left(\frac{9}{4}\right)^{3/2} = \left(\frac{3^2}{2^2}\right)^{3/2} = \frac{3^3}{2^3} = \frac{27}{8}$ l. $16^{-1.5} = (4^2)^{-3/2} = 4^{-3} = \frac{1}{64}$

m. $(\sqrt[3]{-27})^2 = -27^{2/3} = (-3^3)^{2/3} = -3^2 = -9$ n. $\sqrt[3]{125^2} = 125^{2/3} = (5^3)^{2/3} = 5^2 = 25$ o. $(\sqrt[3]{4})^6 = 4^{6/3} = 4^2 = 16$

12 p. $(\sqrt{5})^{-2} = 5^{-2/2} = 5^{-1} = \frac{1}{5}$ q. $(\sqrt[4]{2})^{-4} = 2^{-4/4} = 2^{-1} = \frac{1}{2}$ r. $(\sqrt[5]{3})^5 = 3^{5/5} = 3^1 = 3$

2) Simplify each expression completely.

a. $3^{5/3} \times 3^{1/3} = 3^2 = 9$

b. $(5^{2/3})^{1/2} = 5^{2/6} = 5^{1/3} = \sqrt[3]{5}$

c. $\frac{1}{36^{-1/2}} = 36^{1/2} = \sqrt{36} = 6$

d. $\left(\frac{5^2}{8^2}\right)^{-1/2} = \frac{5^{-1}}{8^{-1}} = \frac{8}{5}$

e. $\frac{125^{1/9}}{5^{1/4}} = \frac{(5^3)^{1/9}}{5^{1/4}} = \frac{5^{1/3}}{5^{1/4}} = \frac{5^{4/12}}{5^{3/12}} = 5^{1/12} = \sqrt[12]{5}$

f. $(10^{3/4} \times 4^{3/4})^{-4} = 10^{-3} \cdot 4^{-3} = \frac{1}{1000} \cdot \frac{1}{64} = \frac{1}{64000}$