

8.2 In-class Practice

1. Match each expression from Column I with the equivalent choice from Column II.

I		II	
1. $3^{1/2}$	2. $(-27)^{1/3}$	A. -4	B. 8
3. $-16^{1/2}$	4. $(-25)^{1/2}$	C. $\sqrt{3}$	D. $-\sqrt{6}$
5. $(-32)^{1/5}$	6. $(-32)^{2/5}$	E. -3	F. $\sqrt{6}$
7. $4^{3/2}$	8. $6^{2/4}$	G. 4	H. -2
9. $-6^{2/4}$	10. $36^{0.5}$	I. 6	J. Not a real number

2. Evaluate, if possible.

a) $-625^{\frac{1}{4}}$ b) $81^{\frac{3}{4}}$ c) $(-36)^{\frac{1}{2}}$ d) $\left(-\frac{27}{64}\right)^{-\frac{2}{3}}$

3. Rewrite in radical notation and then simplify, if possible. Assume that all variables represent positive real numbers.

a) $6x^{\frac{1}{4}}$ b) $(36a^2)^{\frac{1}{2}}$ c) $(-32y^{10})^{-\frac{1}{5}}$ d) $\left(\frac{125x^{12}}{y^{18}}\right)^{\frac{1}{3}}$

4. Simplify each expression. Write all answers with positive exponents. Assume that all variables represent positive real numbers.

a) $\left(x^{-\frac{1}{3}} \cdot y^{-\frac{2}{5}}\right)^{-15}$ b) $\left(\frac{x^{\frac{3}{4}}}{y^{\frac{1}{2}}}\right)^{-\frac{2}{3}}$ c) $\frac{a^{\frac{3}{4}}b^{-\frac{1}{4}}}{(a^2b)^{\frac{1}{2}}}$ d) $p^{\frac{2}{3}}\left(p^{\frac{1}{2}} - 2p^{-\frac{1}{3}}\right)$

5. Simplify by first converting to rational exponents. Assume that all variables represent positive real numbers.

a) $\sqrt[6]{x^8}$ b) $\sqrt{5} \cdot \sqrt[3]{5}$ c) $\frac{\sqrt[3]{x^2}}{\sqrt[4]{x^2}}$ d) $\sqrt[3]{\sqrt{a^2}}$

e) $\sqrt{x} \cdot \sqrt[3]{2x}$ f) $\left(\sqrt[3]{x^2y^5}\right)^{12}$ g) $\frac{\sqrt[3]{y^2}}{\sqrt[6]{y^5}}$ h) $\sqrt[3]{a^2 \cdot \sqrt{a}}$

6. Find the **domain** of the function $f(x) = (2x - 3)^{-\frac{1}{3}}(x + 5)^{\frac{1}{2}}$.

7. According to Kepler's third law of planetary motion, the average radius R of the orbit of a planet around the sun is determined by $R = T^{\frac{2}{3}}$, where T is the number of years for one orbit and R is measured in astronomical units (AU).

- a) It takes Mars 1.881 years to make one orbit of the sun. What is the average radius (in AUs) of the orbit of Mars?
- b) The average radius of the orbit of Saturn is 9.5 AU. Use the accompanying graph to estimate the number of years it takes Saturn to make one orbit of the sun.

