

Section A.1

Section Objectives:

- Work with positive, negative and rational (fraction) exponents.
- Know the algebraic properties of exponents.
- Use rationalization to simplify expressions.

Practice Problems

1. Simplify the following expressions:

(a) $2^3 = 2 \cdot 2 \cdot 2 = 8$

(b) $\sqrt[5]{32} = 2$ since $2^5 = 32$

(c) $\frac{x^2}{x^5} = x^{2-5} = x^{-3}$

(d) $(y^3)^5 = y^{3 \cdot 5} = y^{15}$

(e) $\left(\frac{x^2 y^3}{x^3 z}\right)^{-3} = \frac{x^{2 \cdot -3} y^{3 \cdot -3}}{x^{3 \cdot -3} z^{-3}} = \frac{x^{-6} y^{-9}}{x^{-9} z^{-3}} = x^{-6+9} y^{-9} z^3 = x^3 y^{-9} z^3$

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(f) $\sqrt{72a^4b^3c^5} = \sqrt{2 \cdot 36} \sqrt{a^4} \sqrt{b^3} \sqrt{c^5} = 6\sqrt{2} a^2 b^{3/2} c^{5/2}$

2. Rewrite the expression using positive or negative rational exponents instead of radicals and division.

(a) $\sqrt[4]{x^3} + \frac{\sqrt{x^3}}{y^4} = x^{3/4} + x^{3/2} y^{-4}$

(b) $\frac{\sqrt{(x^2+1)^3}}{(x^2+1)^4} = \frac{(x^2+1)^{3/2}}{(x^2+1)^4} = (x^2+1)^{3/2-4} = (x^2+1)^{-5/2}$

3. Rationalize the denominator:

(a) $\frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

(b) $\frac{1}{4+\sqrt{2}} = \frac{1}{(4+\sqrt{2})(4-\sqrt{2})}$

4. Rationalize the numerator and simplify:

$$\frac{\sqrt{x+1}-2}{x-3}$$

More Practice from Textbook A.1: You should do as many problems from each set (1-64, 65-72, 73-84, 85-92, 93-96), as needed until you are comfortable with these techniques.