

2.1-2.4 Project

Properties (Exponents)

Zero property of Exponents $x^0 = 1, x \neq 0$

Property of Negative Exponents $x^{-n} = \frac{1}{x^n}$

Product of Powers Property

Quotient of Powers Property

Power of a Product Property

Power of Quotient Property

$$x^m \cdot x^n = x^{m+n}$$

$$\frac{x^m}{x^n} = x^{m-n}$$

$$(xy)^n = x^n y^n$$

$$\left(\frac{x}{y}\right)^n = \frac{x^n}{y^n}$$

$$3^0 = 1, 3 \neq 0$$

$$3^{-4} = \frac{1}{3^4}$$

$$3^2 \cdot 2^4 = 6^6$$

$$\frac{9^4}{3^3} = 3^1 = 3$$

$$(3 \times 2)^2 = 3^2 \cdot 2^2$$

$$\left(\frac{3}{4}\right)^5 = \frac{3^5}{4^5}$$

Examples (Simplifying radical expressions)

$$\begin{aligned} \textcircled{1} \quad & 19\sqrt{7} - 3 + 6\sqrt{7} - 9 \\ & 16\sqrt{7} + -2\sqrt{7} \\ & \boxed{14\sqrt{7}} \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad & 6 - \sqrt{13} - 5\sqrt{13} - 8 \\ & \boxed{-7\sqrt{13}} \end{aligned}$$

$$\begin{aligned} \textcircled{3} \quad & (x^{3/2})^{2/3} = (27)^2 \\ \sqrt[3]{x^9} &= \sqrt[3]{729} \\ & \boxed{x=9} \end{aligned}$$

$$\begin{aligned} \textcircled{4} \quad & (x^{3/4})^{4/3} = (27)^4 \\ \sqrt[3]{x^3} &= \sqrt[3]{531441} \\ & \boxed{x=81} \end{aligned}$$

Examples (Solving radical expressions)

$$\begin{aligned} \textcircled{1} \quad & 55 = \sqrt{21d} \\ 55^2 &= (\sqrt{21d})^2 \\ 3,025 &= 21d \\ 144 &\approx d \end{aligned}$$

$$\begin{aligned} \textcircled{3} \quad & 5\sqrt{x} + 7 = 22 \\ 5\sqrt{x} &= 15 \\ \sqrt{x} &= 3^2 \\ x &= 9 \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad & x = \sqrt{4x+1} + 1 \\ (x-1)^2 &= (\sqrt{4x+1})^2 \\ x^2 - 2x + 1 &= 4x + 1 \\ x^2 - 6x &= 0 \\ x(x-6) &= 0 \end{aligned}$$

$$x=0 \text{ or } x=6$$

$$\begin{aligned} \textcircled{4} \quad & 10 - 3\sqrt{x} = -5 \\ -3\sqrt{x} &= -15 \\ \sqrt{x} &= 5 \\ x &= 25 \end{aligned}$$