5/15 Algebra I - Downing

6.1 Properties of Exponents

Ex) $(-1.5y)^2 = (-1.5)^2 (y)^2 = \boxed{2.25y^2}$

↑make sure you use parenthesis

$(-2)^2 = 4$
$(-2)^3 = -8$
$(-2)^4 = 16$
$(-2)^5 = -32$
$(-2)^6 = 64$
$(-2)^7 = -128$

Ex) $\left(\frac{a}{-10}\right)^3 = \frac{a^3}{(-10)^3} = \frac{a^3}{-1000}$ or $\boxed{-\frac{a^3}{1000}}$

Ex) $\left(\frac{2x}{3}\right)^{-5} = \frac{(2)^{-5}(x)^{-5}}{(3)^{-5}} = \frac{(3)^5}{(2)^5(x)^5} = \boxed{\frac{243}{32x^5}}$

* A negative base raised to an even power is positive
* A negative base raised to an odd power is negative

Ex) $\left(-\frac{4}{n}\right)^5 = \frac{(-4)^5}{(n)^5} = \boxed{\frac{-1024}{n^5}}$

6.2 Radical and Rational Exponents $-3^4 = -81$

* Use your calculator to round to the nearest hundredth

Ex) $\sqrt[4]{25} = 2.24$ in your calculator $4 \boxed{\sqrt[x]{\ }} 25$

Ex) $\sqrt[5]{2.5} = 1.20$

Ex) $\sqrt[3]{55} = 3.80$

Ex) $\sqrt[4]{-24}$ = Domain Error No Real Solutions

The Real n^{th} roots of "a" (Let n be an integer >1, let "a" be a real number)

- If n is odd, then a has one real n^{th} root.

$\sqrt[n]{a} = a^{\frac{1}{n}}$

Ex) $\sqrt[5]{35} = (35)^{\frac{1}{5}} = (35)$^$(1/5) = 2.04$

Ex) $\sqrt[3]{-6} = (-6)^{\frac{1}{3}} = -1.82$

- If n is even and $a > 0$, there are two real n^{th} roots

Ex) $\sqrt[4]{60} = \pm 2.78$

- If n is even and $a = 0$, there is one real n^{th} root.

  Ex) $\sqrt[n]{0} = 0$

- If n is even and $a < 0$, there are <u>no real</u> n^{th} roots

<u>Rational Exponents</u>

$$\left(\sqrt[n]{a}\right)^m = \sqrt[n]{a^m} = a^{\frac{m}{n}}$$

Radical Form   Rational Form

Ex) $16^{\frac{3}{4}} = \left(\sqrt[4]{16}\right)^3$ or $\sqrt[4]{16^3}$ Ex) $\sqrt[7]{15^3} = (15)^{\frac{3}{7}}$

Ex) $27^{\frac{4}{3}} = \left(\sqrt[3]{27}\right)^4$ or $\sqrt[3]{27^4}$

HW online