

JANUARY 31, 2012

Aug 2

GET OUT YOUR NOTES



1/31 - Properties of Roots of Real Numbers

1. Product of Powers Property

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

$$\sqrt[6]{2^6} \\ = 2$$

$$2^{\frac{1}{2}} \cdot 2^{\frac{3}{2}} \\ = 2^{\frac{1}{2} + \frac{3}{2}} \\ = 2^{\frac{4}{2}} \\ = 2^2 \\ = 4$$

$$\sqrt[3]{4} \cdot \sqrt{4} \\ = 4^{\frac{1}{3}} \cdot 4^{\frac{1}{2}} \\ = 4^{\frac{1}{3} + \frac{1}{2}} \\ = 4^{\frac{5}{6}}$$

$$= \sqrt[6]{4^5} \\ = \sqrt[6]{(2^2)^5} \\ = \sqrt[6]{2^{10}} \\ = 2 \sqrt[6]{2^4} \\ = 2 \sqrt[6]{16}$$

2. Power of a Power Property

$$\left(a^m\right)^n = a^{mn}$$

$$\begin{aligned} & \left(4^{\frac{3}{2}}\right)^2 \\ &= 4^{\frac{3}{2} \cdot 2} \\ &= 4^3 \\ &= 64 \end{aligned}$$

$$\begin{aligned} & \left(\sqrt{4^3}\right)^2 \\ &= \sqrt{64}^2 \\ &= 8^2 \\ &= 64 \end{aligned}$$

3. Power of a Product Property

$$(ab)^n = a^n b^n$$

$$\begin{aligned} & (4 \cdot 9)^{\frac{1}{2}} && \sqrt[3]{3} \cdot \sqrt[3]{9} \\ = 36^{\frac{1}{2}} & \leftarrow && = \sqrt[3]{27} \\ = \sqrt{36} & && = 3 \\ = 6 & && \end{aligned}$$
$$\begin{aligned} & = 4^{\frac{1}{2}} \cdot 9^{\frac{1}{2}} \\ & = \sqrt{4} \cdot \sqrt{9} \\ & = 2 \cdot 3 \\ & = 6 \end{aligned}$$

4. Negative Power Property

$$a^{-n} = \frac{1}{a^n} \text{ if } a \neq 0$$

$$\begin{aligned} & 4^{-\frac{1}{2}} \\ = & \frac{1}{4^{\frac{1}{2}}} \\ = & \frac{1}{2} \end{aligned}$$

5. Zero Power Property

$$a^0 = 1 \text{ if } a \neq 0$$

$$\left(\sqrt[3]{4}\right)^0 = 1$$

$$\left(5^{\frac{2}{3}}\right)^0 = 1$$

6. Quotient of Powers Property

$$\frac{a^m}{a^n} = a^{m-n} \text{ if } a \neq 0$$

$$\begin{aligned} \frac{5^{\frac{3}{2}}}{5^{\frac{1}{2}}} &= 5^{\frac{3}{2} - \frac{1}{2}} \\ &= 5^1 = 5 = 5 \\ \frac{\sqrt{5}^3}{\sqrt{5}^2} &= \sqrt{5}^2 \\ &= 5 \end{aligned}$$

7. Power of a Quotient Property

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n} \text{ if } b \neq 0$$

$$\begin{aligned} & \left(\frac{27}{8}\right)^{\frac{1}{3}} \\ &= \frac{27^{\frac{1}{3}}}{8^{\frac{1}{3}}} \\ &= \frac{3}{2} \end{aligned}$$

$$\begin{aligned} & \frac{\sqrt{50}}{\sqrt{2}} \\ &= \sqrt{\frac{50}{2}} \\ &= \sqrt{25} \\ &= 5 \end{aligned}$$

$$\sqrt[3]{8x^3}$$

$2 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x$

$$= 2x$$

$$\sqrt[3]{81a^2b^3c^8}$$

$3 \cdot 3 \cdot 3 \cdot 3 \cdot a \cdot a \cdot b \cdot b \cdot b$
 $c \cdot c \cdot c \cdot c \cdot c \cdot c \cdot c$

$$= 3bc^2\sqrt[3]{3a^2c^2}$$

$$\sqrt[4]{64x^5y^6z^{10}}$$

2^6

$$= 2xyz^2\sqrt[4]{2^2xy^2z^2}$$
$$= 2xyz^2\sqrt[4]{4x^2y^2z^2}$$

$$\sqrt[3]{-81u^4v^6w^{10}}$$

$$= -3uv^2w^3\sqrt[3]{3uw}$$

$$1\sqrt[4]{5} + 3\sqrt[4]{5}$$
$$= 4\sqrt[4]{5}$$

$$\sqrt{8} - \sqrt{2}$$

4·2

$$= 2\sqrt{2} - \sqrt{2}$$
$$= \sqrt{2}$$

$$\sqrt[3]{270} - 2\sqrt[3]{10}$$

27·10

$$= 3\sqrt[3]{10} - 2\sqrt[3]{10}$$
$$= \sqrt[3]{10}$$

HOMEWORK

PAGE 371 ~~#8-66 EVEN~~

8-42, 56-66 even

DUE