1.a) 4^5 b) $(-3)^4$ c) $(1/8)^2$ d) $y^{\frac{1}{3}}$

2. a) 4 b) -125 c) $8^{(\frac{1}{8})^2}$ d) 0 $\frac{1^2}{8} = 0.125$

5. a) 2 340 000 b) 999 600 000 c) 0.5352 d) 2.34

0.000009996

9. 2.34×10^{12}

5.347×10^{-8}

3.45×10^{-1} 0.345

5.6×10^{-4}

-3.489×10^{14}

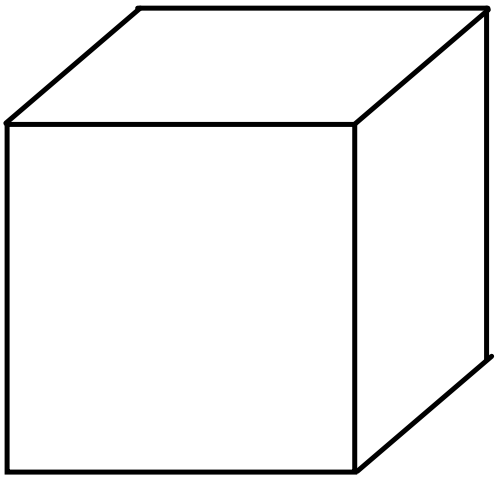
1.0×10^{6}

-2×10^{-6} -0.000002

1.234×10^{12}

-2×10^{-6}

8.a) Find the volume of the cube. Write your answer in scientific notation.



2.25×10^3 m

$(2.25 \times 10^3 m)^3$ 2250

$2.25^3 \times 10^9$

11.39×10^9

1.139×10^{10}

Exponent Laws

$a^3 \cdot a^2 = a^3 \cdot a^1 = a^4$

$2^2 \times 2^5 = 2 \cdot 2 \quad 2\ 2\ 2\ 2\ 2 = 2^7$

$3^2 \cdot 3^2 = 3^{21}$

$x^2 \cdot x^5 = x^7$

$a^m \times a^n = a^{m+n}$ $a \neq 0$

same base → add exponents

$(2^2)^5 = 2^{10} = 4^5$

$2^2\ 2^2\ 2^2\ 2^2\ 2^2$ $(a^2)^5 = a^{10}$

$(a^2)^5 = a$

$(a^m)^n = a^{mn}$ ~~$a \neq 0$~~

power of power: multiply exponents

$(2x)^3 = 2^3 x^3 = 8x^3$ $(ab)^3 = a^3b^3$

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

sharing is caring: exponents

$(ab)^m = a^m b^n$ $a \neq 0, b \neq 0$

$(ab)^3 \neq ab^3$ $2x^3 \neq (2x)^3$

$a^3 b^3$

$\frac{x^5}{x^3} = x^{5-3} = x^2$ $\frac{x^3}{x^5} = x^{-2}$:

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

dividing exponents: subtract

$\left(\frac{2}{3}\right)^5 = \frac{2^5}{3^5}$ $\left(\frac{x^2}{y^3}\right)^5 = \frac{x^{10}}{y^{15}}$

$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$ $a \neq 0, b \neq 0$

fraction: exponent multiplies top & bottom

$\left(\frac{x^2y^1}{c}\right)^5 = \frac{x^{10}y^5}{c^5}$

$64 \times 8^3 = ?$

$8^2 \times 8^3 = 8^5$

$\frac{1}{8} = 8^{-1}$

$\sqrt{8} = 8^{\frac{1}{2}}$