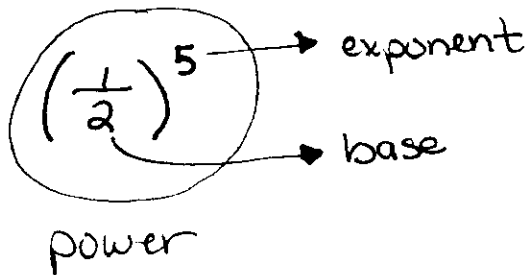


Chapter 10: Exponents and Scientific Notation

10.1 Exponents and Order of Operations p. 412



$\frac{1}{2}$ is used as a factor 5 times

$$\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{1}{2}\right) = \frac{1}{32}$$

$$\frac{1 \cdot 1 \cdot 1 \cdot 1 \cdot 1}{2} \neq \frac{1}{2}^5 \neq \left(\frac{1}{2}\right)^5$$

\downarrow \downarrow \downarrow
 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{32}$

* the exponent is right next to the factor

A) Write each product using exponents.

a) $(-7) \cdot (-7) \cdot (-7) = (-7)^3$ * Not -7^3
 $\hookrightarrow -7 \cdot 7 \cdot 7$

b) $\pi \cdot \pi \cdot r \cdot r \cdot r = \pi^2 r^3$ * no dots

c) $(-2) \cdot (-2) \cdot x \cdot x \cdot x = (-2)^2 x^3$

d) $4 \cdot 4 \cdot 4 \cdot 4 = 4^4$

e) $\frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} = \left(\frac{1}{4}\right)^5$ * must have parenthesis

B) Evaluate each expression.

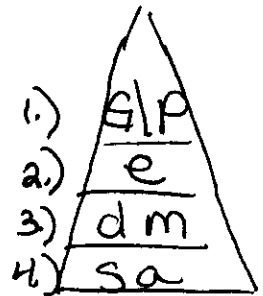
a) $(-2)^4 = -2 \cdot -2 \cdot -2 \cdot -2 = \boxed{16}$ * the base is -2

b) $-2^4 = -2 \cdot 2 \cdot 2 \cdot 2 = 16$ * the base is 2

c) $(-3)^3 = -3 \cdot -3 \cdot -3 = -27$ * the base is -3

d) $-3^3 = -3 \cdot 3 \cdot 3 = -27$ * the base is 3

c) Using the Order of Operations



$$\begin{aligned} \text{a) } & 3 + 2 \cdot 3^4 \\ & 3 + 2 \cdot 81 \\ & 3 + 162 \\ & \boxed{165} \end{aligned}$$

$$\begin{aligned} \text{b) } & 3^3 - 8^2 \div 2 \\ & 27 - 64 \div 2 \\ & 27 - 32 \\ & \boxed{-5} \end{aligned}$$

$$\begin{aligned} \text{c) } & -5^4 \\ & \boxed{-625} \end{aligned}$$

$$\text{d) } \left(-\frac{1}{6}\right)^3 = \boxed{-\frac{1}{216}}$$

$$\begin{aligned} \text{e) } & \left| -3^3 \div 27 \right| \\ & \left| -27 \div 27 \right| = \left| -1 \right| = \boxed{1} \end{aligned}$$

$$\begin{aligned} \text{f) } & 9 - 2^5 \cdot 0.5 \\ & 9 - 32 \cdot 0.5 \\ & 9 - 16 \\ & \boxed{-7} \end{aligned}$$

$$\begin{aligned} \text{g) } & 4^2 - 8(2) + 3^3 \\ & 16 - 16 + 27 \\ & 0 + 27 \\ & \boxed{27} \end{aligned}$$

$$\begin{aligned} \text{h) } & \left(-\frac{2}{3}\right)^3 + \left| 5^2 - 2 \cdot 15 \right| \\ & -\frac{8}{27} + \left| 25 - 30 \right| \\ & -\frac{8}{27} + 5 \\ & \boxed{4 \frac{19}{27}} \end{aligned}$$