

10.1 Exponents

3 to the fourth power
3 is used as a factor 4 times

Base → 3^4 ← exponent
power

$3^4 = 3 \cdot 3 \cdot 3 \cdot 3$
factors

Evaluate 3^4
81

Example 1: Write each product using exponents.

A) $6 \cdot 6 \cdot 6 \cdot 6$
 6^4

B) $a^1 \cdot a^2 \cdot a^3 \cdot a^4 \cdot a^5 \cdot a^6$
 a^6

C) $(-2) \cdot (-2) \cdot x \cdot x \cdot x$
 $(-2)^2 x^3$

Example 2: Evaluate each expression.

D) $(-2)^4$
 $(-2)(-2)(-2)(-2)$
4
16

$(-2)^3 = -2^3$
 $(-2)^3$ vs. -2^3
 $(-2)(-2)(-2)$ vs. $-(2 \cdot 2 \cdot 2)$
-8 vs. -8

E) -2^4 Base 2
 $(-1)(2)(2)(2)(2)$
-16

Review of PEMDAS...

- 1 P ()
- 2 E x^h
- 3 MD → L to R $\times \div$
- 4 AS → L to R $+ -$

Review of Absolute Value...

$|-2| = 2$ Distance away origin on number line

$|2| = 2$ + or 0

$|0| = 0$

$3 + |2 - 4|$

$3 + |-2|$

$3 + 2$
5

Example 3: Evaluate each expression.

F) $2 - 4 \cdot 5^2$
 $2 - 4 \cdot 25$
 $2 - 100$
-98

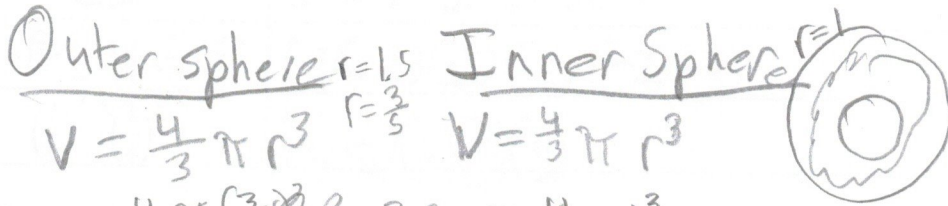
G) $5 + 6^2 \div 4$
 $5 + 36 \div 4$
 $5 + 9$
14

H) $|(-2)^3 \div 4|$
 $|(-2)(-2)(-2) \div 4|$
 $|-8 \div 4|$
 $|-2|$
2

Example 4:

In sphering, a person is secured inside a small, hollow sphere that is surrounded by a larger sphere. The space between the spheres is inflated with air. What is the volume of the inflated space?

$$V = \frac{4}{3} \pi r^3$$



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$$V = \frac{4}{3} \pi \left(\frac{3}{2}\right)^3 \quad \frac{3}{2} \cdot \frac{3}{2} \cdot \frac{3}{2} \quad V = \frac{4}{3} \pi 1^3$$

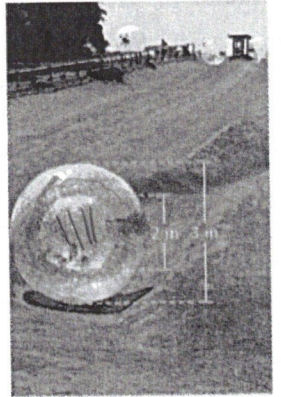
$$V = \frac{4}{3} \pi \frac{27}{8} \quad V = \frac{4}{3} \pi$$

$$V = \frac{4}{3} \cdot \frac{27}{8} = \frac{9}{2}$$

$$V = \frac{9}{2} \pi$$

$$\frac{9}{2} \pi - \frac{4}{3} \pi$$

$$\frac{27\pi}{6} - \frac{8\pi}{6} = \frac{19\pi}{6} \text{ m}^3$$



Prime Factorization

