

Chapter 10.1-10.4

Exponents

Test Next Tuesday

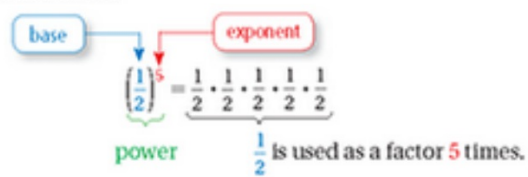
***New Seats!**

10.1 Exponents

Learning Targets:

-  **Writing Expressions using Exponents**
-  **Evaluating Expressions with Exponents**
-  **Using Order of Operations**
-  **Real-Life Applications**

A **power** is a product of repeated factors. The **base** of a power is the common factor. The **exponent** of a power indicates the number of times the base is used as a factor.



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Power

Base

Exponent

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

Writing Expressions using Exponents

Write each product using exponents.

a. $(-7) \cdot (-7) \cdot (-7)$

✓

$$(-7)^3$$

b. $\pi \cdot \pi \cdot r \cdot r \cdot r$

$$\pi^2 \cdot r^3$$

Write the product using exponents.

1. $\frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4}$

✓

$$\left(\frac{1}{4}\right)^5$$

2. $0.3 \cdot 0.3 \cdot 0.3 \cdot 0.3 \cdot x \cdot x$

7

$$0.3^4 x^2$$

Let's eat, Grandma!

$$\frac{2}{3}^4 = \frac{2 \cdot 2 \cdot 2 \cdot 2}{3} = \frac{16}{3}$$

$$\left(\frac{2}{3}\right)^4 = \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} = \frac{16}{81}$$

Evaluating Expressions with Exponents (Solve - get a numeric answer)

Evaluate each expression.

a. $(-2)^4$

$$(-2)(-2)(-2)(-2)$$

$$16$$

b. -2^4 — 2^4

$$-(2 \cdot 2 \cdot 2 \cdot 2)$$

$$-16$$

Using Order of Operations

Solve
Evaluate each expression.

a. $3 + 2 \cdot 3^4$

$$\begin{aligned} 3 + 2 \cdot 81 \\ 3 + 162 \\ 165 \end{aligned}$$

b. $3^3 - 8^2 \div 2$

$$\begin{aligned} 27 - 64 \div 2 \\ 27 - 32 \\ -5 \end{aligned}$$

On Your Own

Evaluate the expression.

3. -5^4
 $-(5 \cdot 5 \cdot 5 \cdot 5)$

-625

4. $\left(-\frac{1}{6}\right)^3 = \left(-\frac{1}{6}\right)\left(-\frac{1}{6}\right)\left(-\frac{1}{6}\right)$

$-\frac{1}{216}$

5. $|-3^3 \div 27|$

$|-27 \div 27|$

$| -1 |$

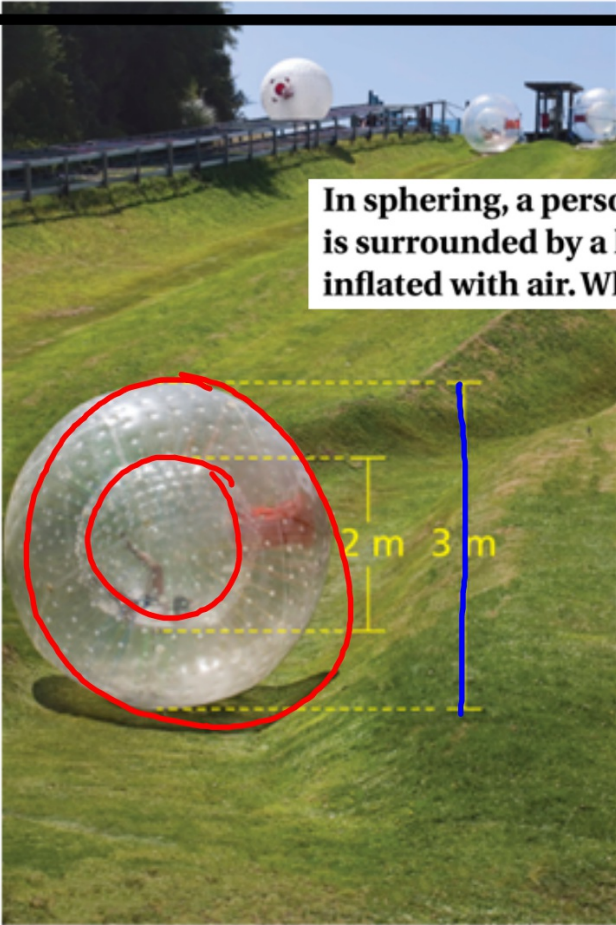
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6. $9 - 2^5 \cdot 0.5$

$9 - 32 \cdot 0.5$
 $9 - 16$

-7

Real-Life Applications

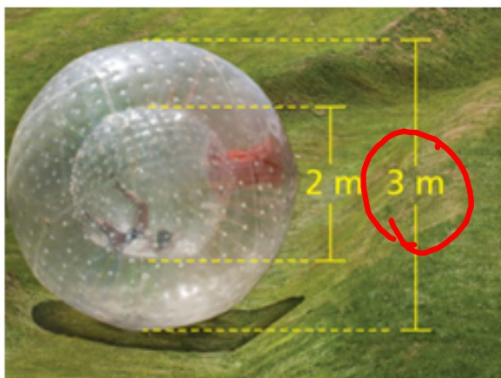


In sphering, a person is secured inside a small, hollow sphere that is surrounded by a larger sphere. The space between the spheres is inflated with air. What is the volume of the inflated space?

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

$$V_B - V_S$$
$$r_B = \frac{3}{2} \quad r_S = 1$$

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?



$$d = 3$$

$$r = \frac{3}{2}$$

Outer Sphere

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

$$= \frac{4}{3}\pi \left(\frac{3}{2}\right)^3$$

$$= \frac{4}{3}\pi \left(\frac{27}{8}\right) \frac{9}{2}$$

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

Inner Sphere

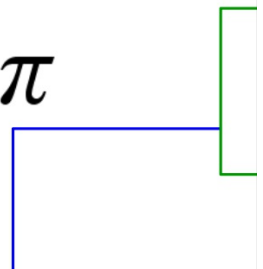
$$V = \frac{4}{3}\pi r^3$$

$$= \frac{4}{3}\pi (1)^3$$

$$= \frac{4}{3}\pi (1)$$

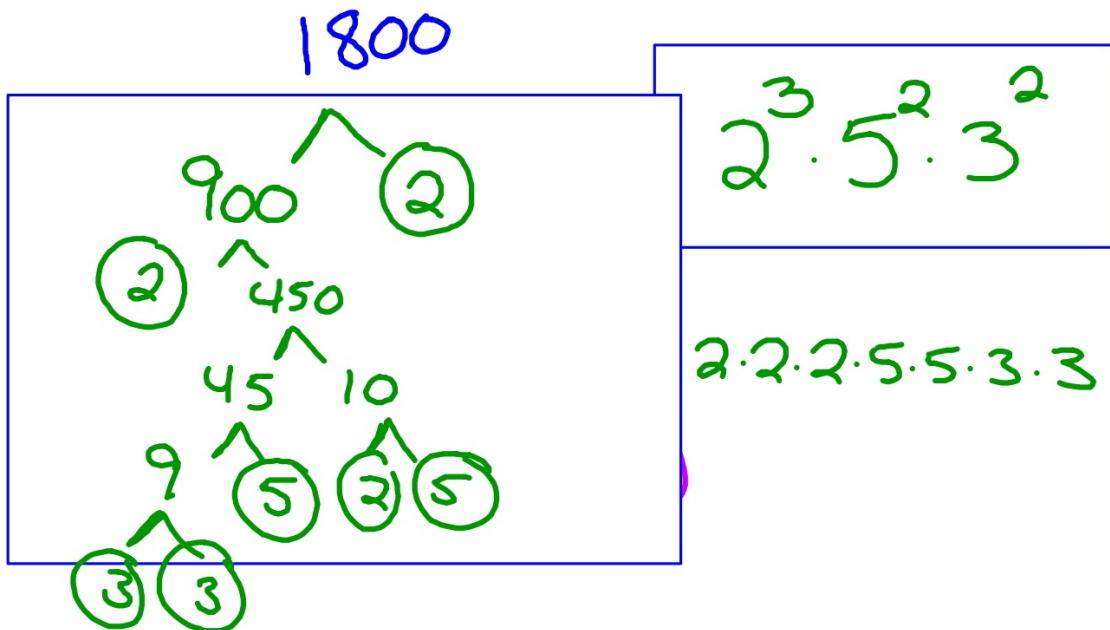
$$= \frac{4}{3}\pi$$

$$\frac{9}{2}\pi - \frac{4}{3}\pi = \frac{27}{6}\pi - \frac{8}{6}\pi = \frac{19}{6}\pi$$



Prime Factorization (Review)

Write the prime factorization of 1800



Homework

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