

Lesson 10.1: Exponents

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Essential Question

How can you use exponents to write numbers?

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Write the product using exponents.

1. $2 \cdot 2 \cdot 2$

$$2^3$$

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

$$(-7)^2$$

NOT -7^2

3. $\frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3}$

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

NOT $\frac{2^5}{3}$

4. $\left(-\frac{1}{6}\right) \cdot \left(-\frac{1}{6}\right) \cdot \left(-\frac{1}{6}\right)$

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

5. $11 \cdot 11 \cdot 11 \cdot 11 \cdot 11 \cdot 11 \cdot 11$

$$11^7$$

6. $\left(-\frac{1}{4}\right) \cdot \left(-\frac{1}{4}\right) \cdot \left(-\frac{1}{4}\right) \cdot \left(-\frac{1}{4}\right)$

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

Warm up

Write each product using exponents.

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

$$(-7)^3$$

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

$$\pi^2 r^3$$

Example 1

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. $0.3 \cdot 0.3 \cdot 0.3 \cdot 0.3 \cdot x \cdot x$ $0.3^4 x^2$

On your own 1-2

Evaluate each expression.

a. $(-2)^4$ $(-2) \cdot (-2) \cdot (-2) \cdot (-2) = 16$

b. -2^4 $-2 \cdot 2 \cdot 2 \cdot 2 = -16$

Example 2

Evaluate each expression.

PEMDAS
↑

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

$$3 + 2 \cdot 81 = 3 + 162 = 165$$

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

$$\begin{array}{r} 27 - 64 \div 2 \\ \hline 27 - 32 \\ \hline -5 \end{array}$$

Example 3

Evaluate the expression.

3. -5^4

$$\begin{array}{l} -5 \cdot 5 \cdot 5 \cdot 5 \\ -625 \end{array}$$

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

$$\begin{array}{l} \left(-\frac{1}{6}\right)\left(-\frac{1}{6}\right)\left(-\frac{1}{6}\right) \\ -\frac{1}{216} \end{array}$$

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

$$\begin{array}{l} |-27 \div 27| \\ | -1 | \\ 1 \end{array}$$

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

$$\begin{array}{l} 9 - 32 \cdot 0.5 \\ 9 - 16 \\ -7 \end{array}$$

On your own 3-6