

REVIEW OF POWER LAWS

GRADE 9

Lesson 3

Connect

Question 1:

Use number examples to show why the following exponent laws are true.

$$(y^a)(y^b) = y^{a+b}$$

$$(2^3)(2^2) = 2^5$$

$$(8)(4) = 32$$

$$32 = 32$$

✓

$$\frac{y^a}{y^b} = y^{a-b}$$

$$\frac{(2^3)}{(2^2)} = 2^{3-2}$$

$$\frac{8}{4} = 2^1$$

$$2 = 2$$

✓

$$(y^a)^b = y^{ab}$$

$$(2^3)^2 = 2^6$$

$$(8)^2 = 2^6$$

$$64 = 64$$

✓

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Connect

Question 1:

Use number examples to show why the following exponent laws are true.

$$(xy)^a = x^a y^a$$

$$4^2 = 2^2 \cdot 2^2$$

$$16 = 4 \cdot 4$$

$$16 = 16$$

✓

$$\left(\frac{2^2}{3^2}\right)^3 = \frac{2^6}{3^6}$$

$$\left(\frac{x^a}{y^a}\right)^b = \frac{x^{ab}}{y^{ab}}$$

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

$$(2)^2 = \frac{16}{4}$$

$$4 = 4$$

✓

$$\left(\frac{2^2}{3^2}\right)\left(\frac{2^2}{3^2}\right)\left(\frac{2^2}{3^2}\right) = \frac{2^6}{3^6}$$

Connect

Question 2:

Write each of the following as a single power of 10

$$10^6 \times 10^5$$

$$10^{11}$$

$$10^8 \times 10^3 \times 10^1$$

$$10^{12}$$

$$\frac{10^8 \times 10^2}{10^4}$$

$$= \frac{10^{10}}{10^4}$$

$$= \boxed{10^6}$$

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Question 2:

Write each of the following as a single power of 10

$$\frac{(-10)^3 \times 10^4}{10^3}$$
$$\frac{-10^7}{10^3}$$
$$\boxed{-10^4}$$

$$\frac{(-10)^3 (-10)^5}{10^4}$$
$$\frac{(-10)^8}{10^4}$$
$$\boxed{10^4}$$

$$\left(-\frac{1}{10}\right)^3 \times 10^5$$
$$\left(\frac{-1^3}{10^3}\right) \cdot \frac{10^5}{1}$$
$$\frac{-10^5}{10^3}$$
$$\boxed{-10^2}$$

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Question 2:

Write each of the following as a single power of 10

$$-10^3 (10^5) \left(-\frac{1}{10}\right)^4$$
$$\frac{-10^8}{1} \cdot \frac{1}{10^4}$$
$$\frac{-10^8}{10^4}$$
$$\boxed{-10^4}$$

$$\left(\frac{10^3 \times 10^2}{-10}\right)^3$$
$$\left(\frac{10^5}{-10}\right)^3$$
$$\frac{10^{15}}{-10^3} \quad \left| \quad (-10^4)^3$$
$$\boxed{-10^{12}} \quad \left| \quad \boxed{-10^{12}}$$

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Practice

Complete 4.4 Worksheet #3,4,5

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