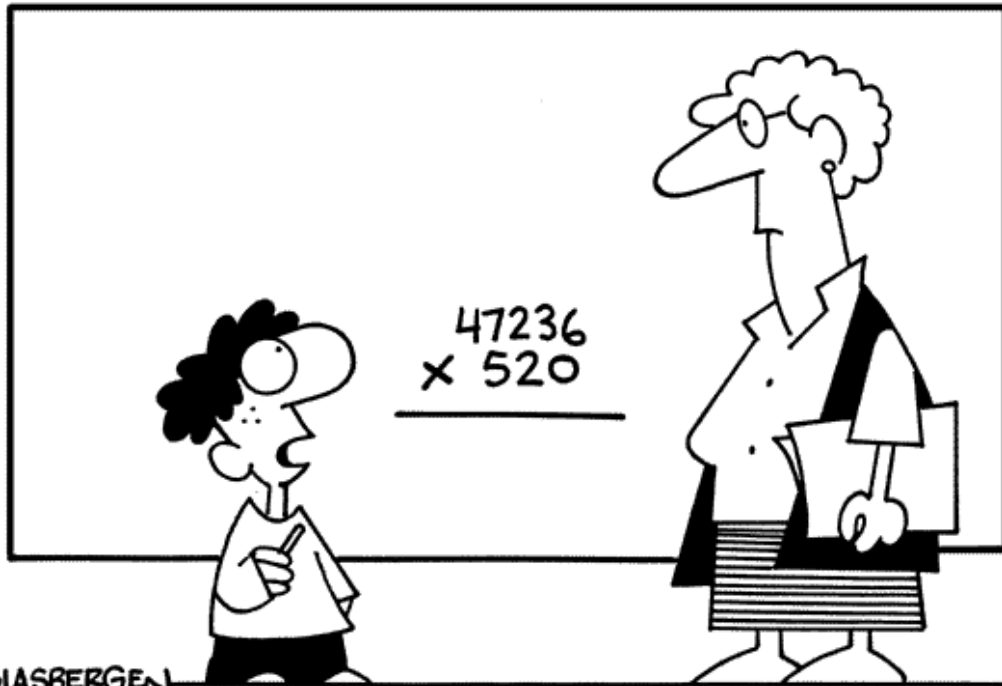


Prerequisites:

Exponents



GLASBERGEN

“Aren’t there enough problems in the world already?”

Properties of exponents:

Let a and b be real numbers and let m and n be integers.

Property Name	Definition	Example
Product of Powers	$a^m \cdot a^n = a^{m+n}$	$5^3 \cdot 5^{-1} = 5^{3+(-1)} = 5^2 = 25$
Power of a Power	$(a^m)^n = a^{mn}$	$(3^3)^2 = 3^3 \cdot 2 = 3^6 = 729$
Power of a Product	$(ab)^m = a^m b^m$	$(2 \cdot 3)^4 = 2^4 \cdot 3^4 = 1296$
Negative Exponent	$a^{-m} = \frac{1}{a^m}, a \neq 0$	$7^{-2} = \frac{1}{7^2} = \frac{1}{49}$
Zero Exponent	$a^0 = 1, a \neq 0$	$(-89)^0 = 1$
Quotient of Powers	$\frac{a^m}{a^n} = a^{m-n}, a \neq 0$	$\frac{6^{-3}}{6^{-6}} = 6^{-3-(-6)} = 6^3 = 216$
Power of a Quotient	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$	$\left(\frac{4}{7}\right)^2 = \frac{4^2}{7^2} = \frac{16}{49}$

$$2^3 \cdot 2^2 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 5$$

$$\underline{3}^2 \cdot \underline{2}^3 =$$

$$(2^2)^4 = 2 \cdot 2 \quad 2 \cdot 2 \quad 2 \cdot 2 \quad 2 \cdot 2 = 2^8$$

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

$$\cancel{(3+2)^6} = \cancel{3+2^6}$$

$$:(x+2)^2 \neq x^2+4$$

$$(2x)^2 = 4x^2$$

$$3^{-2} = \frac{1}{3^2} = \frac{1}{9}$$

$$\frac{1}{4^{-2}} = 4^2 = 16$$

$$\begin{aligned} 3^3 &= 27 \\ 3^2 &= 9 \quad \downarrow \\ 3^1 &= 3 \quad \downarrow \\ \rightarrow 3^0 &= 1 \quad \downarrow \\ 3^{-1} &= \frac{1}{3} \quad \downarrow \\ 3^{-2} &= \frac{1}{9} \quad \downarrow \end{aligned}$$

$$\frac{2^4}{2^9} = 2^{-5} = \frac{1}{2^5} = \frac{1}{32}$$

$$\left(\frac{3x^2 y^5 z^3}{15x^3 y^9 z^2} \right)^0$$

Simplify the expression:

$$\text{a) } (-4a^2b^{-2}) (2a^3b^5) = -8a^5b^3$$

$$\text{b) } \left(\frac{6x^3}{y} \right)^{-3} = \frac{6^{-3} x^{-9}}{y^{-3}} = \frac{y^3}{216 x^9}$$

$$\text{c) } \frac{18a^3b^{-3}}{6a^{-3}b^2} = \frac{3a^6}{b^5}$$

$a^{3-(-3)}$
 b^{-3-2}

You try!

$$\text{a) } (-2)^2 \cdot (-3t^7)^2$$

$$4 \cdot 9 t^{14} = 36t^{14}$$

$$\text{b) } \left(\frac{4}{v}\right)^2 \left(\frac{4}{v}\right)^{-3} = \frac{4^2 4^{-3}}{v^2 v^{-3}}$$
$$\frac{4^{-1}}{v^{-1}} = \frac{4}{v}$$

$$(-2z^3)^{-2} (-3z^2)^3 =$$

$$\frac{-2^{-2} z^{-6}}{(-2)^2} (-3)^3 z^6 = \frac{1}{4} \cdot -27 z^0 = \boxed{\frac{-27}{4}}$$

$$9z^4(4z^2)^3 =$$

HW: Continue working on P1-P3
assignment