Math 8 Unit 1 worksheet: Powers of powers, products and quotients

Name _____ Date _____ Period _____

1. Simplify. Any letter under a fraction bar is nonzero.

(a) $(w^3)^8$ (b) $(-2x^3)^4$ (c) $(5a^2b^3)^2$ (d) $\left(\frac{x}{3}\right)^4$

(e) $(-4c^5)^3$ (f) $(0.1k^2)^3$ (g) $(-m^2n)^5$ (h) $\left(\frac{a^3}{2b^4}\right)^5$

2. Fill in each blank so that the equation is true for every value of the letters. Any letter under a fraction bar is nonzero.

(a) $(x^{\square})^4 = x^{28}$

(b) $(2y^{\square})^3 = 8y^{15}$

(c) $(\square\, p^2)^3 = -27p^6$

(d) $\left(\frac{3}{k^{\square}}\right)^2 = \frac{9}{k^{10}}$

(e) $(a^3b^{\square})^{\square} = a^{12}b^{20}$

3. Write $20^3 \cdot 5^3$ as a single power, and then as a power of 10.

Free sample from math.wiki for classroom use. Do not post. math.wiki

4. In computing, a kilobyte is often counted as $2^{10} = 1024$ bytes. A megabyte is then 2^{10} kilobytes, and a gigabyte is 2^{10} megabytes.

(a) How many bytes are in a gigabyte? Give the answer as a single power of 2.

(b) Since $2^{10} = 1024$ is close to $1000 = 10^3$, estimate the number of bytes in a gigabyte as a power of 10.

5. Ethan simplified four expressions and got each one wrong. For each, say what he did wrong and write the correct answer.

(a) $(x^3)^4 = x^7$

(b) $(-3a^2)^2 = -9a^4$

(c) $(2m^5)^3 = 2m^{15}$

(d) $(y^2)^3 \cdot y^4 = y^{24}$

6. Write each number as a single power of 2. Then list the five numbers from least to greatest.

$$4^7, \quad 8^5, \quad 16^3, \quad 2^{3^2}, \quad 32^2$$

7. Find the whole number n that makes each equation true.

(a) $9^n = 3^{14}$

(b) $(4^n)^2 = 2^{24}$

(c) $8^n = 4^6$

8. (a) Find the value of $(2x)^3$ and of $2x^3$ when $x = 5$.

(b) Simplify $(2x)^3$. Then explain why, for every nonzero number x, the value of $(2x)^3$ is the same whole number of times the value of $2x^3$, and find that number.

Free sample from math.wiki for classroom use. Do not post. math.wiki