Math 8 Unit 1 worksheet: Multiplying and dividing powers with the same base

Name _____ Date _____ Period _____

1. Simplify. Write each answer as a single power. The letters stand for nonzero numbers.

(a) $3^5 \cdot 3^2$

(b) $x^{11} \div x^4$

(c) $d \cdot d \cdot d^7$

(d) $\dfrac{12^{10}}{12^9}$

(e) $\dfrac{u^9}{u^2} \cdot u^4$

(f) $v^4 \cdot v^4$

2. Find the whole number n that makes each statement true. The letters p and x stand for nonzero numbers.

(a) $6^n \cdot 6^n \cdot 6^3 = 6^{11}$

(b) $\dfrac{p^{3n}}{p^n} = p^{12}$

(c) $\dfrac{x^{20}}{x^n \cdot x^4} = x^9$

(d) $2^n \cdot 16 = 2^{13}$

3. Write each as a single power of the base named, then find its value.

(a) $\dfrac{2^9 \cdot 4}{32}$, base 2

(b) $\dfrac{3^8}{27}$, base 3

(c) $\dfrac{49 \cdot 7^3}{7^4}$, base 7

(d) $1000 \cdot 10^4 \div 100$, base 10

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4. Here n is a positive whole number and the letters stand for nonzero numbers. Simplify each to a single power.

(a) $\dfrac{a^{5n}}{a^{2n}}$ (b) $c^n \cdot c^n \cdot c^{n+1}$ (c) $\dfrac{b^{2n+5}}{b^{n+1}}$ (d) $\dfrac{y^{4n} \cdot y^n}{y^{3n}}$

5. Decide whether each statement is true or false. Correct each false one: give the right single power, or the right value when no single power of that base fits. The letter x stands for a nonzero number.

(a) $5^3 \cdot 5^6 = 5^{18}$ (b) $\dfrac{x^{12}}{x^3} = x^4$ (c) $2^4 \cdot 2^4 = 2^8$

(d) $3^2 + 3^2 = 3^4$ (e) $2^5 \cdot 3^2 = 6^7$ (f) $\dfrac{10^8}{10^2} = 10^6$

6. A warehouse holds 3^2 crates. Each crate holds 3^4 boxes, and each box holds 3^2 pencils.

(a) How many pencils are in the warehouse? Write the answer as a single power of 3.

(b) All the pencils are repacked into cartons that hold 3^6 pencils each. How many cartons are filled? Write the answer as a single power of 3.

7. (a) A sum of powers does not add its exponents. Even so, $2^n + 2^n = 2^{n+1}$ for every positive whole number n. Explain why.

(b) Write $3^5 + 3^5 + 3^5$ as a single power of 3, and find its value.

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