1.08 Exponents Tuesday Homework

For any number x $\quad x^2 = x \cdot x \quad x^3 = x \cdot x \cdot x \quad x^4 = x \cdot x \cdot x \cdot x$

$x^1 = x \quad x^0 = 1 \quad x^{-1} = \frac{1}{x} \quad x^{-2} = \frac{1}{x^2}$

(1) Calculate all of these quantities for $x = 2$. Thus, your first two answers will be $2^2 = 4$ and $2^3 = 8$.

(2) Calculate all of these quantities for $x = 3$.

(3) Calculate all of these quantities for $x = 5$.

(4) Calculate all of these quantities for $x = 10$.

(5) In your answer to (4), what do you notice about the zeroes?

(6) What is $3^2 + 3^1$?

(7) What is $3^2 \cdot 3^1$?

Answers: (8) $z = 3$. (9) $2^2 \cdot 2^4 = 4 \cdot 16 = 64 = 2^6$. (10) $10^4 \cdot 10^8 = 10^{12} = 1,000,000,000,000$. (11) $10^1 \cdot 10^1 = 10^2 = 100$. (12) $10^0 \cdot 10^1 = 10^1 = 10$. (13) $10^3 \cdot 10^{-1} = 10^2 = 100$.

(8) Your answer to question (7) should be 3^z, where z is some number. What is z?

For any numbers x, a, and b, $\quad x^a \cdot x^b = x^{a+b}$.

(9) What is $2^2 \cdot 2^4$? Is the answer closer to 2^4, or 2^6?

(10) What is $10^4 \cdot 10^8$? Write it in exponent form as 10^n for some number n, and also write it out as a number with all the zeroes.

(11) What is $10^1 \cdot 10^1$ in exponent form as 10^n, and written out as a number?

(12) What is $10^0 \cdot 10^1$ in exponent form as 10^n, and written out as a number?

(13) What is $10^3 \cdot 10^{-1}$ in exponent form as 10^n, and written out as a number?

Answers: (1) $2^2 = 4, 2^3 = 8, 2^4 = 16, 2^1 = 2, 2^0 = 1, 2^{-1} = \frac{1}{2}, 2^{-2} = \frac{1}{4}$.
(2) $3^2 = 9, 3^3 = 27, 3^4 = 81, 3^1 = 3, 3^0 = 1, 3^{-1} = \frac{1}{3}, 3^{-2} = \frac{1}{9}$.
(3) $5^2 = 25, 5^3 = 125, 5^4 = 625, 5^1 = 5, 5^0 = 1, 5^{-1} = \frac{1}{5}, 5^{-2} = \frac{1}{25}$.
(4) $10^2 = 100, 10^3 = 1,000, 10^4 = 10,000, 10^1 = 10, 10^0 = 1, 10^{-1} = \frac{1}{10}, 10^{-2} = \frac{1}{100}$.
(5) The number of zeroes equals the exponent for positive exponents.
(6) $3^2 + 3^1 = 9 + 3 = 12$
(7) $3^2 \cdot 3^1 = 9 \cdot 3 = 27 = 3^3$.