

Problem Set #11 - Exponential Notation and the Product/Quotient of Powers

Name: _____ Class: _____

- 1.) Use what you know about exponential notation to complete the expressions below.

$$\underbrace{(-5) \times \cdots \times (-5)}_{17 \text{ times}} =$$

$$\underbrace{3.7 \times \cdots \times 3.7}_{\text{times}} = 3.7^{19}$$

$$\underbrace{7 \times \cdots \times 7}_{\text{times}} = 7^{45}$$

$$\underbrace{6 \times \cdots \times 6}_{4 \text{ times}} =$$

$$\underbrace{4.3 \times \cdots \times 4.3}_{13 \text{ times}} =$$

$$\underbrace{(-1.1) \times \cdots \times (-1.1)}_{9 \text{ times}} =$$

$$\underbrace{\left(\frac{2}{3}\right) \times \cdots \times \left(\frac{2}{3}\right)}_{19 \text{ times}} =$$

$$\underbrace{\left(-\frac{11}{5}\right) \times \cdots \times \left(-\frac{11}{5}\right)}_{\text{times}} = \left(-\frac{11}{5}\right)^x$$

$$\underbrace{(-12) \times \cdots \times (-12)}_{\text{times}} = (-12)^{15}$$

$$\underbrace{a \times \cdots \times a}_{m \text{ times}} =$$

- 2.) Identify the base and the exponent in each expression.

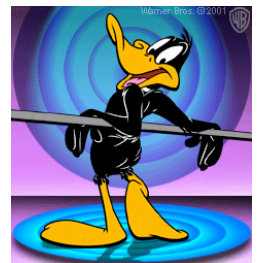
a.) 10^5 Base: _____
Exponent: _____

b.) $(-7)^5$ Base: _____
Exponent: _____

c.) 1^9 Base: _____
Exponent: _____

- 3.) Order the following expressions from least to greatest.

$$-5^2, (-5)^2, \text{ and } -2^5$$



- 4.) Arnie says that if you multiply -3.1 by itself four times, the result in exponential notation would be written as -3.1^4 . Is Arnie right in his notation? Why or why not?

- 5.) Write an expression with (-1) as its base that will produce a positive product. _____

- 6.) Write an expression with (-1) as its base that will produce a negative product. _____

- 7.) Write each number in exponential notation using 2 as the base.

$$8 =$$

$$16 =$$

$$32 =$$

$64 =$

$128 =$

$256 =$

- 8.) Brianna cut a piece of paper in half and threw away one half. She cut the remaining paper in half and threw away one half. She continued doing this until she had a piece of paper whose area was $\frac{1}{32}$ as great as the area of the original piece of paper. How many cuts did she make?

Simplify each expression. Write your answer in exponential notation.

$9.) (-2)^6 \cdot (-2)^2$

$10.) 7.2^3 \cdot 7.2^4$

$11.) q^8 \div q$

$12.) 4^5 \div 4^{-6}$

$13.) xy^2x^4y^3$

$14.) 2.5x^3y^6 \cdot 3x^2y^4$

$15.) \left(\frac{2}{3}\right) \cdot \left(\frac{2}{3}\right)^5$

$16.) \left(-\frac{1}{6}\right)^5 \div \left(-\frac{1}{6}\right)^2$

$17.) \frac{5^9 \cdot 5^7 \cdot 5^8}{5^3 \cdot 5^2 \cdot 5}$

$18.) p \cdot p^8$

$19.) \frac{64a^8b^5}{4a^3b^2}$

$20.) 7^{-9} \div 7^{-5}$

$21.) \left(-\frac{9}{7}\right)^m \cdot \left(-\frac{9}{7}\right)^n =$

$22.) \frac{ab^3}{b^2} =$

$23.) 3^7 \div 3^{-9} =$

24.) $f^{10} \cdot f^{13} =$

25.) $1.2^3 \cdot 1.2^4 =$

26.) $(-5) \cdot (-5)^5 =$

27.) $\left(\frac{1}{5}\right)^6 \cdot \left(\frac{1}{5}\right)^{11} =$

28.) $(-c)^4 \cdot (-c)^8 =$

29.) $9^4 \cdot 9^6 \cdot 9^{13} =$

30.) $\frac{h^6 k^2}{h^5 k}$

31.) $\frac{28m^7 n^4}{7m^3 n^2}$

32.) $\frac{63x^9 y^7}{9x^3 y^4}$

33.) Let x be a positive integer. If $(-3)^9 \cdot (-3)^x = (-3)^{14}$, what is the value of x ?

34.) Pluto has a diameter of about 10^3 kilometers. The diameter of Saturn is approximately 10^5 kilometers. How many times as great as Saturn's diameter is Pluto's diameter?

35.) Simplify: $\frac{3^6}{3^{-2}}$

(A) 3^{-18}

(B) 3^{-2}

(C) 3^3

(D) 3^8

36.) Which number is equivalent to $\frac{4^4}{4^2}$?

(A) 2

(B) 8

(C) 16

(D) 256

37.) Which expression is equivalent to $2^6 \times 2^{-4}$?

(A) 2^{10}

(B) 2^2

(C) 2^{-2}

(D) 2^{-24}



38.) What does it mean to persevere? How do you plan to make sure you persevere in this class?