Name __Key__   Date _____

Midterm Review - chapters 1 and 2   Math 8

Chapter 1 - Exponents

RULES: When multiplying powers with the same base - __add__ the exponents.

When dividing powers with the same base - __subtract__ the exponents.

When raising a power to another power - __multiply__ the exponents.

When you have a negative exponent with a base take the reciprocal and change the exponent to a positive.

Example: $5^{-3} = \frac{1}{5^3}$

Simplify each expression. Write the expression using only a positive exponent, when necessary.

1. $7^0 = \boxed{1}$

2. $8^{-2} = \boxed{\dfrac{1}{8^2}}$

3. $\dfrac{25x^{-3}}{5x^5} = 5x^{-8} = $

$\dfrac{5}{1} \cdot \dfrac{1}{x^8} = \boxed{\dfrac{5}{x^8}}$

4. $(x^4)^3 = \boxed{x^{12}}$

5. $3x \cdot 7x^2 = \boxed{21x^3}$

6. $\dfrac{5^3 \cdot 5^4}{5^2} = \dfrac{5^7}{5^2} = \boxed{5^5}$

Chapter 2 - Scientific Notation

Tell whether each number is written correctly in scientific notation. If it is NOT in scientific notation, state the reason.

1. 4.37×10^8 ___Yes___

2. 0.56×10^{-1} ___No – 0.51 is less than 1___

3. 9.3×100^4 ___No – 100^4 is not a power of 10___

Write each number in scientific notation.

4. $3,400 \rightarrow 3.4 \times 10^3$

5. $12,500 \rightarrow 1.25 \times 10^4$

6. $0.00088 \rightarrow 8.8 \times 10^{-4}$

Write the solution to each problem below. Be sure that your answer is in scientific notation.

7. $(2.37 \times 10^4) + (1.4 \times 10^5)$

1.637×10^5

8. $(9.6 \times 10^7) - (8.4 \times 10^6)$

8.76×10^7

9. $(2.16 \times 10^8) \div (2.4 \times 10^7)$

9×10^0

10. $(4 \times 10^6) \div (8 \times 10^3)$

5×10^2

11. In 2013 the Los Angeles Dodgers opening day payroll was about $\$2.16 \times 10^8$ and the Houston Astros opening day payroll was about $\$2.4 \times 10^7$. How much higher was the Dodgers' payroll?

$$(2.16 \times 10^8) - (2.4 \times 10^7)$$
$$\boxed{1.92 \times 10^8}$$

12. In 2012, New York City (NYC) and Los Angeles (LA) has the highest populations of any cities in the United States. NYC's population was about 8.1×10^6 and LA's population was about 3.8×10^6.

a) Which city, NYC or LA has the highest population? Justify your answer.

$NYC = 8.1 \times 10^6$

$LA = 3.8 \times 10^6$

Nyc has the highest population b/c 8.1 > 3.8 and both are $\times 10^6$.

b) What is the population of these two cities combined?

$$(8.1 \times 10^6) + (3.8 \times 10^6)$$
$$\boxed{1.19 \times 10^7}$$

13. The mass of Jupiter is approximately 6.82×10^{30} kilograms. The mass of Mars is approximately 3,690,000,000,000,000,000,000,000,000,000,kilograms. What is the difference between the approximate masses, in kilograms, of Jupiter and Mars? Express your answer in scientific notation.

Mars: 3.69×10^{30}

Jupiter: 6.82×10^{30}

$$(6.82 \times 10^{30}) - (3.69 \times 10^{30})$$
$$\boxed{3.13 \times 10^{30} kg}.$$