ANSWER KEY

Unit I Exponents and Scientific Notation Review Sheet

Write the product using an exponent.

____ 1. $14 \cdot 14 \cdot 14 \cdot 14 \cdot 14 \cdot 14$

a. 6^{14}

b. 14^{6}

c. 84^{6}

d. $14 \bullet 6$

Evaluate the power.

____ 2. 2^4

a. 17

b. 16

c. 18

d. 15

3. 5^5 3125

4. 0^6 0

____

5. Mr. Boswell asked his students to write the product $(0.4)(0.4)(0.4)(0.4)(0.4)$ using an exponent and then evaluate the expression. Mary Jo's and Stewart's work is shown below. Which student made a mistake when following Mr. Boswell's instructions? Explain.

Mary Jo's work:

$(0.4)(0.4)(0.4)(0.4)(0.4) = (0.4)^5 = 0.01024$

Mary Jo is correct

Stewart's work:

$(0.4)(0.4)(0.4)(0.4)(0.4) = 0.4 \cdot 5 = 2$

Incorrect. This would be correct if Mr Boswell asked to add 5 of (0.4) together.

6. A student writes that 3^4 equal 12. What is wrong with that answer? What is the correct answer?

The student multiplied 3x4 $3^4 = 3 \cdot 3 \cdot 3 \cdot 3 =$ $9 \times 9 = 81$ ← correct answer.

Find the missing exponent.

7. $\frac{15^{?}}{15^2} = 15^3$ ← Positive exponent means top heavy.

$3 + 2 = 5$ or. $x - 2 = 3$ $+2 \quad +2$ $x = 5$

Find the product. Write your answer using exponents.

___ 8. $3^4 \cdot 3^7$ 3^{11}

a. 3^{28} b. 9^{28} c. 9^{11} d. 3^{11}

Simplify the expression. Write your answer using exponents.

9. $p^{11} \cdot p^5$ p^{16}

Simplify the expression.

10. $3g^6 \cdot 3^3 g^9$ $3^4 g^{15}$

11. $\frac{5x^7y^8 \cdot 6x^1y^3}{3x^2y} = \frac{30x^8y^4}{3x^2y^1} = 10x^6y^{10}$

x coefficients

Steps
- Simplify numerator and denominator seperately
- Then divide

Copy and complete the statement using <, >, or =.

12. 5^4 ___ $5^3 \cdot 5^2$

$5^4 < 5^5$

13. $7^9 \_\_ 7^7 \cdot 7^2$

$7^9 = 7^9$

14. If $\frac{2^a}{2^b} = 2^1$, what is true about the values of a and b?

exponent of 1 means that a is always 1 more than b.

$a = 1$
$b = 0$

Thinking Question!

Write the expression using only positive exponents.

15. $15^0 a^{-3} b^0$

a^{-3} ← means bottom heavy.

$\frac{1}{a^3}$

Find the product. Write your answer using nonnegative exponents.

16. $k^{-5} \cdot k^{11}$

k^6

17. $m^{-2} \cdot m^3 \cdot m^{-7}$

m^{-6}

$\frac{1}{m^6}$

Find the quotient. Write your answer using only positive exponents.

18. $\frac{2a^1 b^{-9}}{4a^{-4} b^5}$

$\frac{2a^1 a^4}{4b^5 b^9} = \frac{2a^5}{4b^{14}} = \frac{1a^5}{2b^{14}}$

19. $\frac{32w^{-8}}{4w^{-12}}$

$\frac{32w^{12}}{4w^8} = 4w^4$

20. $\frac{19}{x^{-7}}$

$19x^7$

21. Consider the expression $\frac{x^{-2}}{8x^4}$.

$\frac{1}{8x^4 x^2} = \frac{1}{8x^6}$

Find the quotient. Write your answer using only positive exponents.

22. Suppose a particle has a mass of 10^{-4} kilogram. What would the mass of 10^9 of these particles be?

23. Compare the expressions $\frac{5a}{b^2}$ and $5ab^{-2}$. How are the expressions alike? How are they different? *Explain.*

$\frac{5a}{b^2}$

$\frac{5ab^{-2}}{1} = \frac{5a}{b^2}$

The expressions are equivalent in value.

The expressions are different in that the 1ST uses only positive exponents.

Which exponential expression is equal to $2^{-5} \bullet 2^{8}$?

2^3

2 - -1 = 3 A. $\frac{2^2}{2^{-1}} = 2^3$

3 · -1 = -3 B. $(2^3)^{-1} = 2^{-3}$

-2 - -1 = -1 C. $\frac{2^{-2}}{2^{-1}} = 2^{-1}$

-1 · 3 = -3 D. $(2^{-1})^3 = 2^{-3}$

Which number goes in the numerator to make the equation true?

$\frac{?}{2^{-2}} = 2^3$

$2^2 \cdot 2^{\square} = 2^3$

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A. 2^{-2}

B. 2^{-3}

C. 2^{-9}

D. 2^{-18}

Sorry don't know what happened here?

Can we simplify (rearrange) the following:

$$\frac{4^6}{7^6}$$ NO

What would be good questions to ask yourself?

(1) What is the base?

Because the bases are different you can not combine the two.

What is the product of the expression below?

$3^1 \cdot (3^2)^{-2}$ $= 3^1 \cdot 3^{-4} = 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$

A. 3

B. 1

C. $\frac{1}{27}$

D. $\frac{1}{81}$