

NAME: _____

Math _____, Period _____

Mr. Rogove

Date: _____

STUDY SHEET: RULES OF EXPONENTS

INSTRUCTIONS: the problems below are similar to some of the problems on the assessment. You can and should use the first six lessons as a guide if you get stuck. Answers have been posted to our class website. I have a good feeling that if you can do these problems, you'll be fine for the assessment.

1. Write an equivalent expression that is the product of unique prime numbers, each raised to an integer power

a. $\frac{15^9 \times 6^{12}}{4^6 \times 9^{10}}$

b. $\frac{6^7 \times 8^5}{3^6 \times 2^{22}}$

2. Is there something wrong with the following? Why or why not. If incorrect, correct it.

a. $3^6 \times 9^4 = 27^{10}$

b. $4^4 \times 8^4 = 2^{20}$

c. $3^7 \times 2^8 = 2 \times 6^{14}$

d. $8^{-3} \times 6^9 \times 3^9 = 9^9$

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1. Write an equivalent expression that is the product of unique prime numbers, each raised to an integer power

<p>a. $\frac{15^9 \times 6^{12}}{4^6 \times 9^{10}}$</p> $= \frac{(3^9 \times 5^9) \times (3^{12} \times 2^{12})}{(2^6 \times 2^6) \times (3^{10} \times 3^{10})}$ $= \frac{5^9 \times 3^{21} \times 2^{12}}{3^{20} \times 2^{12}}$ $= 3 \times 5^9$	<p>b. $\frac{6^7 \times 8^5}{3^6 \times 2^{22}}$</p> $= \frac{(3^7 \times 2^7) \times (2^5 \times 2^5 \times 2^5)}{3^6 \times 2^{22}}$ $= \frac{3^7 \times 2^{22}}{3^6 \times 2^{22}}$ $= 3$
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2. Is there something wrong with the following? Why or why not. If incorrect, correct it.

<p>a. $3^6 \times 9^4 = 27^{10}$</p> <p>There is something wrong...you cannot multiply bases and add exponents. The only way you can add exponents is if you have the same base. The correct way to solve this problem would be to get the same base—either 3 or 9, and then add the exponents and keep the base.</p> <p>Method 1</p> $3^6 \times 9^4 \neq 27^{10}$ $(3^2)^3 \times 9^4$ $= 9^3 \times 9^4$ $= 9^7$ <p>Method 2</p> $3^6 \times 9^4 \neq 27^{10}$ $3^6 \times (3^2)^4$ $= 3^6 \times 3^8$ $= 3^{14}$	<p>b. $4^4 \times 8^4 = 2^{20}$</p> <p>This is correct.</p> $4^4 \times 8^4$ $= (2 \times 2)^4 \times (2 \times 2 \times 2)^4$ $= 2^8 \times 2^{12}$ $= 2^{20}$
<p>c. $3^7 \times 2^8 = 2 \times 6^{14}$</p> <p>This is not correct. It's close...but not correct.</p> $3^7 \times 2^8$ $= 3^7 \times 2^7 \times 2$ $= 2 \times 6^7$	<p>d. $8^{-3} \times 6^9 \times 3^9 = 9^9$</p> <p>Incredibly enough, this is correct.</p> $8^{-3} \times 6^9 \times 3^9$ $= (2^3)^{-3} \times (2^9 \times 3^9) \times 3^9$ $= 2^{-9} \times 2^9 \times 3^9 \times 3^9$ $= 2^0 \times (3 \times 3)^9$ $= 9^9$