In Class Review Test 1a

Name Key Date 10/3/17 Period All Pre Algebra

How can I manipulate numbers into different forms and why is it important?

You can write numbers using exponents. Example 81 can be written as 9^2 or 3^4. It is important because we can simplify large numbers by using exponent laws.

A. Product Rule states when multiplying monomials to add the exponents when they have the same base.

1. $x^4 \cdot x^2$ is an example of the **Product Rule** because the monomials have the same base

Solution: $x^4 \cdot x^2 = x^{4+2} = x^6$

2. $2^3 \cdot 2^2$ is an example of the **Product Rule** because the monomials have the same base

Solution: $2^3 \cdot 2^2 = 2^{3+2} = 2^5 = 32$

3. $3^2 \cdot 2^2$ is **not** an example of the **Product Rule** because the integers are not the same base

Solution: $3^2 \cdot 2^2 = 9 \cdot 4 = 36$

4. $(x^3y^3)(x^2y)$ is an example of the **Product Rule** because each monomial has common bases

Solution:

$$(x^3y^3)(x^2y) = x^3 \cdot x^2 \cdot y^3 \cdot y = x^{3+2} \cdot y^{3+1} = x^5y^4$$

Examples:

a. $3^2 \cdot 3^2$

$3^4 = 81$

b. $5^2 \cdot 2^2$

$25 \cdot 4 = 100$

c. $(2^3y^2)(2^2y^3)$

$2^{3+2} \cdot y^{2+3}$

$2^5 y^5$

$32y^5$

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B. Quotient Rule states when dividing monomials to Subtract the exponents when they have the same base.

5. $\frac{3^4}{3^2}$ is an example of the **quotient rule** because the integer base is the same

Solution: $3^{4-2}=3^2=9$

6. $\frac{4^2\cdot 2^4}{4\cdot 2^2}$ is an example of the **quotient rule** because the integer base is the same

Solution: $4^{2-1}\cdot 2^{4-2}=4\cdot 2^2=4\cdot 4=16$

7. $\frac{4^3}{2^2}$ is **not** an example of the **quotient rule** because the integer base is not the same

Solution: $\frac{4^3}{2^2}=\frac{4\cdot 4\cdot 4}{2\cdot 2}=\frac{64}{4}=16$

8. $\frac{4^{-1}}{2^2}$ is **not** an example of the **quotient rule** because the integer base is not the same

Solution: $\frac{4^{-1}}{2^2}=\frac{1}{4^1}\cdot\frac{1}{2^2}=\frac{1}{4\cdot 2^2}=\frac{1}{4\cdot 4}=\frac{1}{16}$

$\frac{3^{-1}}{2^3}=\frac{1}{3}\cdot\frac{1}{2^3}=\frac{1}{3\cdot 8}=\frac{1}{24}$

$\frac{3^{-2}}{4}=\frac{1}{3^2}\cdot\frac{1}{4}=\frac{1}{9\cdot 4}=\frac{1}{36}$

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Unit 1a Review:

Simplifying Exponential Expressions

Finish each rule (use the variables to show how you would evaluate the expression).

1. $a^m \bullet a^n = a^{m+n}$

2. $\left(a^m\right)^n = a^{m \cdot n}$

3. $(ab)^m = a^m \cdot b^m$

4. $\frac{a^m}{a^n} = a^{m-n}$

5. $a^0 = 1$

6. $a^{-n} = \frac{1}{a^n}$

Simplify the expression. The simplified expression should have no negative exponents.

7. $\left(x^5\right)^6$

$x^{5 \cdot 6} = x^{30}$

8. $3x^2 \bullet \left(4x^3\right)^2$

$3 \cdot x^2 \cdot 4^2 \cdot x^6 = 12x^8$

9. $6^7 \bullet 6^9$

$6^{7+9} = 6^{16}$

10. $(-2x)^4$

$(-2)^4 x^4 = 16x^4$

11. $(-5)^0 \bullet x$

$1 \cdot x = x$

12. $2^2 \cdot 3^2$

$4 \cdot 9 = 36$

13. $\frac{4^5 \bullet 4^3}{4^2} = \frac{4^8}{4^2} = 4^{8-2} = 4^6$

14. $\frac{y^8}{y^9}$ $y^{8-9} = y^{-1} = \frac{1}{y}$

15. $\frac{6^2}{3^2} = \frac{36}{9} = 4$

16. $\frac{6^{-2}}{2^2} = \frac{1}{6^2} \cdot \frac{1}{2^2} = \frac{1}{36 \cdot 4} = \frac{1}{144}$

$\begin{array}{r} 36 \\ \times\ 4 \\ \hline 144 \end{array}$

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Your test on these topics is next class!

Simplify, if possible. Write your answer as a power or as a product of powers. There should be no negative exponents in your answer.

1. $2^3 \cdot 2^5$

$2^{3+5} = 2^8$

2. $\left(y^2\right)^4$

$y^{2 \cdot 4} = y^8$

3. $(-3x^3)^4$

$(-3)^4 \cdot x^{12} = 81x^{12}$

4. 4^0

1

5. $\left(-3a^3\right)^3 \cdot (4a)^0$

$(-3)^3 a^9 \cdot 1$

$-27a^9$

6. $\left(-a^3b^5\right)^2 \left(a^4b\right)^2$

$-a^{3 \cdot 2} \cdot b^{5 \cdot 2} \cdot a^{4 \cdot 2} \cdot b^{1 \cdot 2}$

$-a^6 \cdot b^{10} \cdot a^8 \cdot b^2$

$-a^{14}b^{12}$

7. 3^{-5}

$\frac{1}{3^5} = \frac{1}{243}$

$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

$9 \cdot 9 \cdot 3$

$81 \cdot 3$

$81 \times 3 = 243$

8. $\left(\frac{4}{7}\right)^{-2}$

$= \frac{4^{-2}}{7^{-2}} = \frac{1}{4^2} \cdot \frac{7^2}{1} = \frac{49}{16}$

9. $2^{-1} \cdot 2^5$

$2^{-1+5} = 2^4 = 16$

10. x^0y^{-4}

$1 \cdot y^{-4} = 1 \cdot \frac{1}{y^4} = \frac{1}{y^4}$