Graded Classwork

Name

Date Due Friday 2/10/17

Multiplication properties of exponents

Working with Powers, Exponents, and Polynomials

When multiplying exponents, it is important to remember the following properties:

1. When multiplying powers having the same base, add the exponents, keeping the same base. (Remember: a^3, a is the base, 3 is the exponent, and a^3 is the power.) For example, $x^3 \cdot x^5 = x^{3+5} = x^8$.
2. When finding a power of a power, multiply the exponents. For example, $(x^3)^2 = x^6$.
3. When finding the power of a product, find the power of each factor and multiply. For example, $(x \cdot y)^2 = x^2 \cdot y^2$.

Simplify $(5x^3)^2(xy)^3$
$(5^2x^6)(x^3y^3)$
$= 25x^9y^3$

Simplify $(2x^4)^3(-x^2)^3$
$(2^3x^{12})(-x^6)$
$= -8x^{18}$

1. What do you do with the exponents when multiplying powers that have the same base?

2. Label the base, the exponent, and the power in x^3.

3. Explain what you are to do when finding the power of a product.

Simplify each expression.

4. $3x \cdot x^2$

5. $(-6xy)^2(x^2y)^3$

6. $(4z^4)^2(2x^2y)(-3xy^3z^5)$

7. $-4x^4 \cdot x^3$

8. $(4x^3y^2)^3(-2x^2y^4)$

9. $(3x)^2(2x^3y^6)(-5x^6y^2)$

10. $(-x^2)(-x)^2$

11. $-xy(-xy)^2$

12. $(3x^3)(5x^5)$

13. $(-2x^3y^3z)^4(2xyz^4)^2$

Name Date

Division properties of exponents

Working with Powers, Exponents, and Polynomials

When dividing exponents, it is important to remember the following properties:

1. When dividing powers that have the same base, subtract the exponents.

   For example, $\frac{x^4}{x^2} = x^{4-2} = x^2$, where x cannot be equal to 0.

2. When finding a power of a quotient, find the power of the numerator and the power of the denominator and divide.

   For example, $(\frac{x}{y})^3 = \frac{x^3}{y^3}$, where y cannot be equal to 0.

Simplify $\frac{6^8}{6^6}$

$= 6^{8-6}$

$= 6^2 = 36$

Simplify $(\frac{3}{4})^{-2}$

$= \frac{3^{-2}}{4^{-2}}$

$= \frac{4^2}{3^2} = \frac{16}{9}$

1. Explain what you do with the exponents when dividing powers that have the same base.

Evaluate each expression.

2. $\frac{5^6}{5^3}$

3. $\frac{(-3)^2}{3^2}$

4. $\frac{3^2}{3^4}$

5. $\frac{5^4 \cdot 5}{5^7}$

6. $(\frac{3}{2})^3$

7. $\frac{7^3}{7}$

8. $\frac{4^8}{4^8}$

9. $\frac{6^4 \cdot 6^3}{6^5}$

10. $(\frac{4}{5})^2$

11. $(\frac{-3}{4})^{-2}$

Simplify each expression.

12. $(\frac{3}{x})^3$

13. $x^5 \cdot \frac{1}{x^7}$

14. $\frac{18x^4y^2}{-6x^2y^4} \cdot \frac{-3x^2y^2}{-y}$

15. $\frac{x^3}{x^5}$

16. $\frac{4x^4y^4}{4x^2y^2} \cdot \frac{4x^2y^4}{2xy}$

17. $\frac{7x^{-3}y^3}{x^2y^{-3}} \cdot \frac{(2x^3y)^{-2}}{x^2y^2}$

18. $x^4 \cdot \frac{1}{x^2}$

19. $\frac{6x^2y^4}{3y^2} \cdot \frac{7x^2y^{-4}}{x^4}$

20. $\frac{8x^{-2}y^4}{x^3y^{-3}} \cdot \frac{(4xy^2)^{-1}}{x^{-2}y^{-2}}$