

Section 2.9 Introduction to Exponent Rules

1. From your notes, rewrite the exponent rules. If they are helpful you can write them on any quiz or test.

The Exponent Rules

$$x^m \cdot x^n =$$

$$(x^m)^n =$$

$$(xy)^m =$$

2. Use the rules to simplify the expressions. You can always expand the exponents if that helps. It's ok to leave large numbers in exponential form. Make sure all members of your group are getting it to prepare for a game.

a. $x^4 \cdot x^7$

b. $(3y^3)^6$

c. $((-5)^2)^5$

d. $((-5)^3)^7$

e. $t^3 \cdot t^9 \cdot t$

f. $5(y^3)^2$

g. $(-2ab)^5$

h. $(-2ab)^6$

i. $(-5x^4)(8x^6)$

j. $4t^4 \cdot 6u^{11}$

Exponent Jeopardy

| Product Rule | Power Rule | Distributing Powers | Mystery Category |
|---------------------|-------------------|----------------------------|-------------------------|
| 100 | 100 | 100 | 100 |
| 200 | 200 | 200 | 200 |
| 300 | 300 | 300 | 300 |
| 400 | 400 | 400 | 400 |
| 500 | 500 | 500 | 500 |

Section 2.10 Simplifying Expressions and Algebraic Properties

3. Apply the properties listed. You do not need to simplify further.

- Use the commutative property of multiplication to rewrite the expression $7x$.
- Use the associative property of multiplication to rewrite the expression $3(5t)$.
- Use the commutative property of addition to rewrite the expression $2x + 20$.
- Use the associative property of addition to rewrite the expression $10 + (4 + x)$.

The Distributive Property

4. Use the distributive property to rewrite the expressions and simplify as much as possible.

a. $4(x - 3)$

b. $-(3 - x)$

c. $-5(2x + 7)$

d. $-11(x - 7)$

e. $-\frac{1}{3}(t + 24)$

f. $\frac{1}{2}(x + 5)$

Like Terms and Simplifying Expressions

5. Simplify the following expressions by combining like terms, if possible.

a. $2x + 9x$

b. $3x - 3t$

c. $2x - 7x$

d. $4x - 11x^3$

e. $-4y - 6y$

f. $4x^3 + x^2$

6. Use all the properties to simplify the following expressions.

a. $6(y-4)+11$

b. $3(2t-3)+9(4t+1)$

c. $5\left(\frac{2}{5}-3y+\frac{1}{5}z\right)$

d. $10-(-9x+6)$

e. $\frac{1}{2}(12t-10)-2(6t+5)$

f. $(7x-3)-3(8x-2)$

Simplifying Expressions with Exponents

7. Find the product of the monomial and the binomial.

a. $\frac{1}{4}t(t-12)$

b. $-5y(3y+8)$

c. $5p^3(6-12p)$

d. $8z\left(-\frac{3}{4}z^2+\frac{1}{2}z\right)$

8. Simplify completely.

a. $6a^3-9a^3(2-a^4)$

b. $7(-2x+9)-9(-2x+8)$

More Practice

9. Simplify the following expressions if possible. If already simplified, then enter the same expression in Webwork.

a. $x^4 + x^4$

b. $x^4 \cdot x^4$

c. $x + x^4$

d. $x \cdot x^4$

10. The number of students enrolled in math courses at PCC has grown over the years. The formulas $M = 0.4x + 3.1$ and $W = 0.36x + 4.8$ describe the number of people who identify as men and women (in thousands) enrolled in math courses at PCC, x years after 2005. Give a simplified formula for the total, T , which is the total of the students who identify as men and women. (Nonbinary students need to be added to this problem.)

11. Simplify the following expressions, if possible. If already simplified, then enter the same expression in Webwork.

a. $-3p^5 - 2p^5$

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

c. $-5p^4 + p^5$

d. $5p^4 \cdot p^4$

12. Find the product of the monomial and the binomial.

a. $-2x^2(6x+1)$

b. $\frac{3}{5}x(x+4)$

c. $-4z^2(z-6)$

d. $11r^2(-4r^2+r)$

13. Simplify completely.

a. $3(4-x)-(10+x)$

b. $4(3t+2)-2(7t-1)$

c. $3y-7y(-7-y^4)$

d. $-5(-8x+1)-7(-4x-3)$

14. Challenge problems.

a. $\frac{1}{2}(4y-8)-\frac{1}{3}y(-9-3y^3)$

b. $-9(x-5(-2x-8))$