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Period

ws of Exponents Lesson Notes

Product of Powers expended Example:  $a^2 \cdot a^3 = aa \cdot aaa = a^5$ 

Algebraic Rule: xm • xn = xm+n

\*bases must be the same to use the product of powers rule

### Simplify.

4.

Solve.

 $X^7 \circ X^2$ 

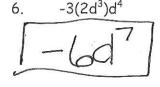


 $(x^2y)(xy^7)$ 







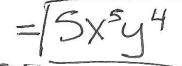


In little league, Mary throws a softball (4b2) times every day. How many times does she 7. throw the ball in  $(2b^3)$  days?

(4h2) (2h3)



Find the area of a rectangle that has a length of  $5(x^2y)$  and a width of  $(x^3y^3)$ 8.



Power of a Power

Power of a Product

Example:  $(a^2)^3 = (aa)(aa)(aa) = a^6$  | Example:  $(x^m y^m)^2$ 

Rule:  $(x^m)^n = x^{m \cdot n}$ 

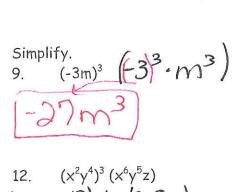
Rule:  $(xy)^m = x^m y^m$ 

### Power of a Monomial

Example:

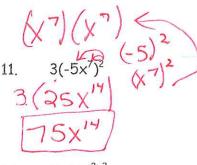
$$(a^2b^3)^2 = (a^2b^3)(a^2b^3) = (aabbb)(aabbb) = a^4b^6$$

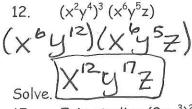
Rule:  $(x^m y^n)^p = x^{m \cdot p} y^{n \cdot p}$ 



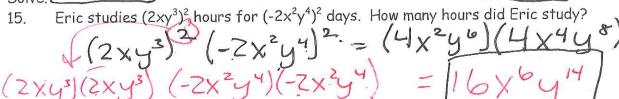
10. 
$$-4(3x^4)^2$$
  
 $-4(9x^8)$   
 $-36x^8$ 

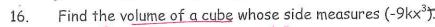
(3x4)(3x4) ED

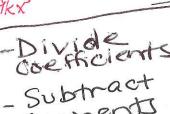




13. 
$$-2(-6x^6y^3)^2$$
  
 $-2(36x^{12}y^6)$   
 $-72x^{12}y^6$ 







$$V = (-9kx^3)^3$$
  
 $V = -729k^3x^9$ 

## Examples: $\frac{a^5}{a^3} = \frac{aaaaa}{aaa} = a^2$

Rule:  $\frac{\chi^m}{\chi^n} = \chi^{m-n}$ 

\*bases must be the same to use the Quotient of Powers rule

Quotient of Powers

Simplify.

17. 
$$\frac{\chi^6}{\chi^3}$$

18. 
$$\frac{-x^5y^4}{x^3y^2}$$

$$\left[-\chi^{2}\right]$$

19. 
$$\frac{(-x)^3 y^5}{xy} - \frac{-x^3 y^5}{x y}$$

20. 
$$\frac{-x^{7}y^{8}}{-x^{2}y}$$

21. 
$$\frac{3x_{10}^{10}y^{11}}{x_{10}^{10}y}$$

23. The area of a rectangle is  $(64x^4y^{10})$ . If the length of the rectangle is  $(2xy^3)$ , find the width.

$$w = \frac{A}{2}$$
  $w = \frac{64 \times 49^{10}}{2 \times 39^{3}}$   $w = 32 \times 39^{7}$ 

24. The area of a rectangle is  $63x^5y^9$ . Find the width of the rectangle if its length is  $9x^4y^6$ .

$$w = \frac{4}{9} \quad w = \frac{63 \times 54^9}{9 \times 74^9} \quad w = 7 \times 4^3$$

The volume of a rectangular prism is  $(36x^5y^9)$ . Find the length of the prism if its width is  $(3x^2y)$  and its height is  $(4xy^3)$ .

and its height is 
$$(4xy^3)$$
.

$$V = \frac{36x^5y^9}{(3x^2y)(4xy^3)} \rightarrow \frac{36x^5y^9}{(3x^3y)(4xy^3)} \rightarrow$$

# 1) multiply coefficients 1) Add ours 2) Add exponents (factors) of Exponents Lesson Assignment

Simplify.

1. 
$$a^2 \cdot a^3 \cdot a^6$$

2. 
$$(cd^2)(c^3d^6)$$

3. 
$$(3p^4)(4p^2)$$

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

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

6. 
$$5x^2(7x^2)$$

Solve.

Eric studies  $(2xy^3)$  hours for  $(-2x^2y^4)$  days. How many hours did Eric study? 7.

8. Find the area of a rectangle with a length of  $(8m^3)$  and a width of  $(4x^2m^4)$ .

9. How much does Christy make if she earns  $\$(3x^3y)$  for braiding  $(-4x^5y^2)$  heads of hair?

## i) Divide coefficients

2) Subtract Openents (factors) Simplify.

10. 
$$\frac{3x^6}{x^3}$$

$$3X^3$$

11. 
$$\frac{-x^5y^{-2}}{x^3y^2}$$
  $\frac{-x^2}{4}$ 

12. 
$$\frac{(-x)^3 y^5}{xy^{-2}}$$
 -  $\times^2 U$ 

13. 
$$\frac{-x^7y^{-8}}{-x^2y}$$

14. 
$$\left(\frac{3x^{10}y^{11}}{x^{10}y}\right)^0 = 1$$

15. 
$$\frac{x^{-3}y^6}{x^{-5}y}$$
  $\frac{x^{-5}y}{}$ 

16. The area of a rectangle is  $(32x^4y^{10})$ . If the length of the rectangle is  $(2xy^3)$ , find the width.



17. The volume of a rectangular prism is  $(100x^{18}y^{12}z^2)$ . If the length of the prism is  $4x^2y^2$  and its width is  $(5x^8y^7z^{-2})$ , find the height of the prism.

 $\sqrt{-\frac{100x^{18}y^{12}z^{2}}{(4x^{2}y^{2})(5x^{8}y^{7}z^{-2})}}$ 

 $\sqrt{\frac{100x^{18}y^{12}z^{2}}{20x^{10}y^{12}z^{2}}} = \frac{15x^{9}y^{3}}{20x^{10}y^{12}z^{2}}$ 

Wh R= Wh