Intro to College Math: Chapter 5.1
Function Notations

* Exponent — a number written just above and to the right of another number, which is called the base.

7^{2} ← exponent
↖ base

*Product Property of Exponents — when multiplying two expressions with the same base, add exponents and use the common base.

ex.) $3^2 \cdot 3^5 = 3^{2+5} = 3^7$ ex.) $x^6 \cdot x^4 = x^{6+4} = x^{10}$

*Power Property of Exponents — when raising a power to another power, you multiply the powers.

ex.) $(5^3)^2 = 5^{3 \cdot 2} = 5^6$ ex.) $(x^2)^4 = x^{2 \cdot 4} = x^8$

* Distributive Property of Powers — when something multiplied together is raised to a power, it is the same thing as each base raised to that power.

ex.) $(xy)^2 = x^2 y^2$ ex.) $(2xy)^3 = 2^3 x^3 y^3$

1. Complete the expression.

a.) $w^p \cdot w^r = w^{(p+r)}$ ← make sure to put ( ) around exponent

b.) $y^6 \cdot y^5 = y^{6+5} = y^{11}$

c.) $3^4 \cdot 3^2 = 3^{4+2} = 3^6$ -or- 729

d.) $2^3 + 2^5 = 40$
↖ can type into calculator.

Typing into xyz:
- Type base 1st
- Then click on $x^{\square}$ in drop down box.
- Then type exponent.

2. Use the product property to simplify this expression.

$k^{12} \cdot k^{10} \cdot k^{8} \cdot k^{6} =$

$k^{12+10+8+6} = \boxed{k^{36}}$

* Since multiply everything with same base, just add exponents

3. Simplify.

$(x^3 y^3)(x^2 y^4)$

$x^3 \cdot x^2 \cdot y^3 \cdot y^4$

$x^{3+2} \cdot y^{3+4}$

$x^5 \cdot y^7$

$\boxed{x^5 y^7}$

* Put Like terms together.
* Then since they are multiplied together, we add the exponents of like terms.

4. Simplify.

$(7x^{10})(9x^4)$

$7 \cdot 9 \cdot x^{10} \cdot x^4$

$63 \cdot x^{10+4}$

$\boxed{63x^{14}}$

* Put Like terms together.
* Then since they are multiplied together, we add the exponents of like terms.

5. Complete the statement of the power rule. And simplify.

a) $(y^c)^d = y^{c \cdot d}$

b.) $(w^5)^4 = w^{5 \cdot 4} = w^{20}$

c.) $(2^4)^2 = 2^{4 \cdot 2} = 2^8$

d.) $3^5 \cdot 3^3 = 3^{5+3} = 3^8$

* When you have an exponent raised to a power, you multiply the exponents together

← Here we add the exponents, because the bases are multiplied together.

6. Simplify this expression by using the properties of exponents. You may leave your answer as a number to a power. $(11a^3)^2$

$(11a^3)^2$

$(11)^2 \cdot (a^3)^2$

$11^2 \cdot a^{3 \cdot 2}$

$11^2 a^6$

* Distribute the exponent outside the ( ), to each term inside the ( ).

* When you have an exponent raised to a power, you multiply the exponents together.

7. Simplify this expression by using the properties of exponents. You may leave your answer as a number to a power. $(8q^3b^5)^3$

$(8q^3b^5)^3$

$(8)^3 \cdot (q^3)^3 \cdot (b^5)^3$

$8^3 \cdot q^{3 \cdot 3} \cdot b^{5 \cdot 3}$

$8^3 q^9 b^{15}$

* Distribute the exponent outside the ( ), to each term inside the ( ).

* When you have an exponent raised to a power, you multiply the exponents together.

8. Use the distributive property of exponents to simplify this expression. You may leave your answer as a number to a power. $(-5ab)^3$

$(-5ab)^3$

$(-5)^3 \cdot a^3 \cdot b^3$

$(-5)^3 a^3 b^3$

* Distribute the exponent outside the ( ), to each term inside the ( ).

* When you have an exponent raised to a power, you multiply the exponents together.

* if you have a (−) number don't forget to keep it in ( ).