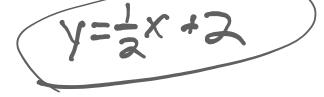
Created by Mr. Lischwe



Write an equation in slope-intercept form that gives the height of the plant (y) after "x" weeks.

1) A cactus plant is originally 2 cm tall, and grows ½ cm per week.



2) A fern grows 3 cm per week, and is 14 cm tall after 2 weeks.



3) A jade plant was originally 10 cm tall, and was 20 cm tall after 4 weeks.

$$y = 2.5x + 10$$

$$\frac{10}{4} = 2.5$$

Who can explain the date problem???

• $1/(\frac{15^{47}}{15^{46}}) = 15' = 15$

If I take 2³⁰ and **double** it, what do I get?
 Write your answer as a power.

$$2^{30} \cdot 2 = 2^{31}$$

p. 27 (1-6, 8, 14-20)

1) $(-6)^7$ 14) 2 2) $-24a^{10}$ 15) 9 3) $-35a^5b^5c^5$ 16) 4 17) 6 4) 8^2 (or 64) 18) 5 5) $2t^3$ 19) 7 6) $x^2 y^5$ 8) $4^1 \cdot 5^1 \cdot 6^1$ or 120

20) Answers vary. Example: $5^{10} \cdot 5^3$

Let's review...

 Why is 2⁷ · 2³ NOT equal to 2²¹ even though this is a multiplication problem?

• Why is
$$\frac{2^{12}}{2^4}$$
 NOT equal to 2^3 even though this is a division problem?

 If you understand WHY a rule works, you are <u>WAY</u> more likely to remember it better!

Table of Contents (2nd Semester)

- p. 1 Exponent Basics (1.2)
- p. 2 Zero and Negative Exponents (1.5)
- p. 3 Multiplying and Dividing Powers (1.3)
- p. 4 Power to a Power (1.4)

Power to a Power

Objective:

Simplify expressions like $\left(x^5
ight)^3$

3

CHALLENGE

- We are going to learn a new exponent rule today.
- Once again, I am not going to tell you the rule right away. I want to see if you can figure it out.
- I am going to display a bunch of problems on the board. Try to figure out how to do these problems. Then use them to figure out the rule for taking a power to a power.

Can you figure out how these would work? $(x^3)^4$ $(a^{5})^{2}$ $\left(\frac{b^2}{a^3}\right)^{4}$ $(3y^4)^2$

After you solve these, come up with some **rules** that you discover about how to take a power to a power.

2 ways to show $(a^5)^2$

 $\frac{Way 1}{(a^5)^2} = (a^5)(a^5) = a^{10}$

$$\frac{\text{Way 2}}{(a^5)^2}$$

$$= (a \cdot a \cdot a \cdot a \cdot a)^2$$

$$= (a \cdot a \cdot a \cdot a \cdot a)(a \cdot a \cdot a \cdot a)$$

$$= a^{10}$$

Taking a Power to a Power (Problems like $(a^5)^2$)

• Keep the base, multiply the exponents

What if there's a coefficient? $(3y^4)^2$

Predictions? = $3y^4 \cdot 3y^4$ = $3 \cdot y \cdot y \cdot y \cdot y \cdot 3 \cdot y \cdot y \cdot y \cdot y$ = $9y^8$

What did we learn?

The coefficient goes to the power outside the parentheses, just like any normal number.

Taking a Power to a Power

• Keep the base, multiply the exponents

TREAT COEFFICIENTS AS A NORMAL NUMBERS. TAKE THEM TO THE POWER OF THE EXPONENT!!!

(The "pretend the variables aren't there" strategy)

•5p⁴ This coefficient is NOT connected to the 4 exponent

• $(5q^2)^4$ This coefficient IS connected to the 4 exponent

But the 5 is NOT connected to the 2 exponent

Examples

1. $(x^2)^5 = (x^2) \cdot (x^2) \cdot (x^2) \cdot (x^2) \cdot (x^2) = x^{10}$

2.
$$(a^4b)^2 = (a^4b) \cdot (a^4b) = a^8b^2$$

3.
$$(2m^3)^4 = (2m^3) \cdot (2m^3) \cdot (2m^3) \cdot (2m^3)$$

= $(2 \cdot m \cdot m \cdot m) \cdot (2 \cdot m \cdot m \cdot m) \cdot (2 \cdot m \cdot m \cdot m) \cdot (2 \cdot m \cdot m \cdot m)$
= $16m^{12}$
4. $(\frac{5g^{50}}{6h^{30}})^2 = (\frac{5g^{50}}{6h^{30}})^2 = \frac{25g^{100}}{36h^{60}}$

Once again...

• WHEN IN DOUBT, EXPAND IT OUT!!!

EXIT TICKET

• Do these on a notecard. You may not get help from me, your classmates, or your notes.

1)
$$8x^4 \cdot 4x^8$$

2) $\frac{16y^7}{8y}$
3) $(3z^5)^3$

Homework

Textbook p. 35 (2-10 even, 14, 20, 21, 22)