8.3 Exploration Name: _____

NO calculators are needed for this.

Review:

1. What is another way to write 3•3•3•3•3 ?

_____

2. What is another way to write x•x•x•x•x•x•x?

_____

New (1)

Think about $4^5 \bullet 4^3$

You could write $(4 \bullet 4 \bullet 4 \bullet 4 \bullet 4) \bullet (4 \bullet 4 \bullet 4)$

But that is the same thing as $4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4 \bullet 4$

And we know THAT is the same thing as 4^8

So $4^5 \bullet 4^3 = 4^8$

3. What does $5^4 \bullet 5^5$ simplify to?

4. What does $10^3 \bullet 10^1 \bullet 10^8$ simplify to?

5. What does $x^3 \bullet x$ simplify to?

6. (Kind of a trick question) What does $a^2 \bullet b^4 \bullet a^5 \bullet a^2 \bullet b^7$ simplify to?

Review

7. Careful!

$(-2)^3$ equals POSTIVE or NEGATIVE 8 ??? _____

$(-2)^4$ equals POSTIVE or NEGATIVE 16 ??? _____

-5^2 equals POSTIVE or NEGATIVE 25 ??? _____

New (2)

Think about $(3^2)^5$

You could write $(3^2)\bullet(3^2)\bullet(3^2)\bullet(3^2)\bullet(3^2)$

But that is the same thing as $(3\bullet 3)\bullet(3\bullet 3)\bullet(3\bullet 3)\bullet(3\bullet 3)\bullet(3\bullet 3)$

And we know THAT is the same thing as 3^{10}

So $(3^2)^5 = 3^{10}$

8. What does $(5^3)^4$ simplify to?

9. What does $(k^7)^2$ simplify to?

10. (Be careful…look back at the last "review") What does $(-3^2)^2$ simplify to?

11. (Kind of a trick question) What does $\left((x^2)^5\right)^6$ simplify to?

New (3)

Think about $(4x)^3$

You could write $(4x) \bullet (4x) \bullet (4x)$

But that is the same thing as $4 \bullet x \bullet 4 \bullet x \bullet 4 \bullet x$

But THAT is the same thing as $4 \bullet 4 \bullet 4 \bullet x \bullet x \bullet x$

And we know THAT is the same thing as $4^3 \bullet x^3$

So $(4x)^3 = 4^3 \bullet x^3$

12. What does $(2h)^6$ simplify to?

13. What does $(mp)^5$ simplify to?

14. (Be careful) What does $(-4x)^6$ simplify to?

15. (Kind of a trick question) What does $(7wp)^3$ simplify to?

Closer!

You have the knowledge to fill in the following 3 properties now:

$a^m \bullet a^n =$ _____ $\quad (a^m)^n =$ _____ $\quad (ab)^n =$ _____