10.2

Product of Powers Property

Do Now

Evaluate the following

1) $2^3 =$

2) $3^2 =$

3) $(-2)^4 =$

4) $-2^4 =$

Product of Powers Property

Example 1

$$a^2 \bullet a^3$$

Example 2

$$m^3 \bullet m^4$$

Let' see...

1) $a^7 \bullet a^8$

2) $f^5 \bullet f^9$

3) $5^2 \bullet 5^3$

4) $\left(\dfrac{3}{4}\right) \bullet \left(\dfrac{3}{4}\right)^4$

5) $x \bullet x^2 \bullet x^3$

The Product of Powers Property:

To multiply powers with the same base _____

_____.

...with coefficients

6) $(5m^7)(8m^8)$

7) $(-7x^4y^3)(4x^2y^6)$

Power of Powers Property

Example 3

$$(n^2)^3$$

Example 4

$$(c^7)^5$$

Let' see...

6) $(5^2)^3$

7) $(x^3)^4$

8) $\left[\left(\dfrac{3}{4}\right)^2\right]^4$

9) $\left[(-8)^4\right]^6$

The Power of Powers Property:

To find a power of a power _____ .

Power of Product Property

Example 5

$$(2d^4)^3$$

Example 6

$$(-4m^2)^3$$

Let' see...

10) $(5d^4)^3$

11) $(-8d^7)^2$

12) $(-3x^2y^5)^3$

13) $(24 \bullet 13)^8$

The Power of Products Property:

_____

_____ .

14) $(-5)^2(-5)^7$

15) $(6^3)^4$

16) $x \cdot (3x)^4$

17) $-(2d)^6$

Name_____ Date_____

10.2 Practice A

Simplify the expression. Write your answer as a power.

1. $2^3 \bullet 2^2$

2. $9^6 \bullet 9^8$

3. $(-7)^3 \bullet (-7)^5$

4. $\left(\dfrac{5}{8}\right)^{10} \bullet \left(\dfrac{5}{8}\right)^2$

5. $c \bullet c^5$

6. $q^4 \bullet q^4$

7. $\left(-\dfrac{4}{9}\right)^2 \bullet \left(-\dfrac{4}{9}\right)^5$

8. $(4.7)^3 \bullet (4.7)^2$

9. $\left(3^2\right)^3$

10. $\left(k^5\right)^{10}$

11. $\left(\left(\dfrac{1}{2}\right)^4\right)^3$

12. $\left((9.2)^3\right)^6$

Simplify the expression.

13. $(4n)^2$

14. $(-2w)^5$

15. $\left(\dfrac{1}{3}p\right)^4$

16. $(2.5j)^3$

17. $(ab)^{18}$

18. $3^2\left(3 \bullet 3^4\right)$

19. Is $3^2 \bullet 4^2 = 12^4$? Evaluate each side of the equation to explain your answer.

20. The volume of a sphere is $V = \dfrac{4}{3}\pi r^3$ and the relationship between the radius r and the diameter d is $r = \dfrac{d}{2}$.

    a. Find the volume of the sphere in terms of the diameter d and simplify the expressions.

    b. What is the volume of the sphere when the diameter is $\dfrac{2}{3}$ centimeter?