Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
POWERS OF MONOMIALS	To raise a monomial to a power, use the **POWER RULE:** $(x^a)^b = x^{ab}$
NUMERICAL BASES	**Directions:** Simplify. Express your final answers using only positive exponents.

1. $(8^2)^5$ → 8^{10}

2. $(-15^6)^3$ → $(-15)^{18}$

3. $(4^{-2})^2$ → $4^{-4} = \frac{1}{4^4}$

4. $(2^4)^{-2}$ → $2^{-8} = \frac{1}{2^8}$

5. $(10^{-3})^{-7}$ → 10^{21}

6. $(3^3)^{-1}$ → $3^{-3} = \frac{1}{3^3}$

VARIABLE BASES

7. $(x^9)^3$ → x^{27}

8. $(a^2)^7$ → a^{14}

9. $(k^4)^{-5}$ → k^{-20}

10. $(cd^2)^4$ → c^4d^8

11. $(m^{-2}n^8)^3$ → $m^{-6}n^{24} = \frac{n^{24}}{m^6}$

12. $(x^{-4}y^{-2})^{-7}$ → $x^{28}y^{14}$

➢ **Examples with Coefficients:**

- Raise the coefficient to the given power.
- SIMPLIFY the variables with the power rule.

13. $(3x^7)^2$ → $3^2x^{7\cdot2} = 9x^{14}$

14. $(5n^4)^3$ → $5^3n^{4\cdot3} = 125n^{12}$

15. $(10x^7)^2$ → $100x^{14}$

16. $(4w^{-7})^4$ → $256w^{-28} = \frac{256}{w^{28}}$

17. $(2p^2q^5)^6$

$64p^{12}q^{30}$

18. $(-7a^8b^3)^2$

$49a^{16}b^6$

19. $(4c^{-9}d^2)^2$

$16c^{-18}d^4 = \frac{16d^4}{c^{18}}$

20. $(-3m^{-2}n^{-5})^3$

$-27m^{-6}n^{-15} = \frac{-27}{m^6n^{15}}$

21. $(5k^6)^{-2}$

$5^{-2}k^{-12} = \frac{1}{25k^{12}}$

22. $(2a^5b^{-2})^{-4}$

$2^{-4}a^{-20}b^8 = \frac{b^8}{16a^{20}}$

MIXED PRACTICE

23. $(6w^8)^2 \cdot 5w^3$

$36w^{16} \cdot 5w^3$

$= 180w^{19}$

24. $(-4a^2)^3 \cdot 2a^7$

$-64a^6 \cdot 2a^7$

$= -128a^{13}$

25. $(5p^4 \cdot 3p^3)^2$

$(15p^7)^2$

$= 225p^{14}$

26. $(x^{-8}y^{-2} \cdot x^3y^9)^4$

$(x^{-5}y^7)^4$

$= x^{-20}y^{28} = \frac{y^{28}}{x^{20}}$

27. $\frac{56k^{28}}{(-2k^8)^3}$

$\frac{56k^{28}}{-8k^{24}} = -7k^4$

28. $\frac{(12c^3d^7)^2}{18c^8d^{10}}$

$\frac{144c^6d^{14}}{18c^8d^{10}} = 8c^{-2}d^4$

$= \frac{8d^4}{c^2}$

29. $40m^6n^{21} + (-4m^2n^7)^3$

$40m^6n^{21} - 64m^6n^{21}$

$-24m^6n^{21}$

30. $(4a^8b^2)^3 - (3a^{12}b^3)^2$

$64a^{24}b^6 - 9a^{24}b^6$

$55a^{24}b^6$

Name: _____ **Unit 2:** Algebraic Expressions

Date: _____ **Per:** _____ **Homework 7:** Powers of Monomials

Directions: Simplify the following monomials. Express final answers using only positive exponents.

1. $(5^4)^3$

5^{12}

2. $(-8^2)^9$

$(-8)^{18}$

3. $(2^2)^{-3}$

$2^{-6} = \frac{1}{2^6}$

4. $(m^9)^4$

m^{36}

5. $(k^{-5})^2$

$k^{-10} = \frac{1}{k^{10}}$

6. $(r^2s^{-1})^{-6}$

$r^{-12}s^6 = \frac{s^6}{r^{12}}$

7. $(10x^7)^2$

$100x^{14}$

8. $(-3n^5)^3$

$-27n^{15}$

9. $(2v^{-6})^5$

$32v^{-30} = \frac{32}{v^{30}}$

10. $(4c^2d^7)^4$

$256c^8d^{28}$

11. $(-6p^5q^{-8})^4$

$1296p^{20}q^{-32} = \frac{1296p^{20}}{q^{32}}$

12. $(5a^{-1}b^{-4})^{-3}$

$\frac{1}{125}a^3b^{12} = \frac{a^3b^{12}}{125}$

13. $(2v^8)^3 \cdot -7v^5$

$8v^{24} \cdot -7v^5$

$-56v^{29}$

14. $\frac{3}{4}x^{10} \cdot (8x^3)^2$

$\frac{3}{4}x^{10} \cdot 64x^6 = 48x^{16}$

15. $(-3m^{10} \cdot 4m^{-6})^2$

$(-12m^4)^2 = 144m^8$

16. $(c^3d^{-1} \cdot cd^{-7})^{-2}$

$(c^4d^{-8})^{-2} = c^{-8}d^{16}$

$= \frac{d^{16}}{c^8}$

17. $\frac{(-4h^9)^2}{24h^4}$

$\frac{16h^{18}}{24h^4} = \frac{2}{3}h^{14}$

$= \frac{2h^{14}}{3}$

18. $\frac{27r^9s^{15}}{(3r^2s^5)^4}$

$= \frac{27r^9s^{15}}{81r^8s^{20}}$

$= \frac{1}{3}rs^{-5} = \frac{r}{3s^5}$

19. $(7p^8q^3)^3 - 132p^{24}q^9$

$343p^{24}q^9 - 132p^{24}q^9$

$211p^{24}q^9$

20. $(-8x^9y^6)^2 + (4x^6y^4)^3$

$64x^{18}y^{12} + 64x^{18}y^{12}$

$128x^{18}y^{12}$