NAME _____ DATE _____

9-2 Dividing by Monomials (Pages 501–505)

Quotient of Powers	You can divide powers with the same base by subtracting exponents. For all integers m and n and any nonzero number a, $\frac{a^m}{a^n} = a^{m-n}$.
Zero Exponent	For any nonzero number a, $a^0 = 1$.
Negative Exponents	For any nonzero number a and any integer n, $a^{-n} = \frac{1}{a^n}$ and $\frac{1}{a^{-n}} = a^n$.

EXAMPLES

Simplify each expression.

A $\frac{a^6b^9}{a^2b^5}$

$\frac{a^6b^9}{a^2b^5} = \left(\frac{a^6}{a^2}\right)\left(\frac{b^9}{b^5}\right)$

$= (a^{6-2})(b^{9-5})$

$= a^4b^4$

B $\frac{(2x^{-3})^{-3}}{(4x^2)^3}$

$\frac{(2x^{-3})^{-3}}{(4x^2)^3} = \frac{2^{-3}x^9}{4^3x^6}$

$= \left(\frac{1}{4^3}\right)\left(\frac{1}{2^3}\right)\left(\frac{x^9}{x^6}\right)$

$= \left(\frac{1}{64}\right)\left(\frac{1}{8}\right)x^{9-6}$

$= \left(\frac{1}{512}\right)x^3$ or $\frac{x^3}{512}$

PRACTICE

Simplify. Assume that no denominator is equal to zero.

1. $x^{-3}y^0z^{-2}$

2. $\frac{d^{-1}}{d^0}$

3. $\frac{4a}{a^8}$

4. $\frac{n^3}{n^{-1}}$

5. $\frac{g^7h^2}{g^5h^0}$

6. $\frac{5s^3}{40s^4}$

7. $\frac{(-u)^2v^8}{u^6v^{-3}}$

8. $\frac{a^2b^9}{a^2b^8}$

9. $\frac{16x^6y^7z^8}{-2x^4y^4z^0}$

10. $\frac{(f^{-5}g^7)^2}{(fg)^{-6}}$

11. $\frac{2rs^3}{3s^3}$

12. $\frac{(-m)^5n^7}{m^2n^7}$

13. $\frac{(j^{-4}k^5)^2}{(7j^2)^2}$

14. $\frac{26a^3}{-13a^6b^8}$

15. $\frac{18rs^0t^9}{6r^8s^7t^4}$

16. $\left(\frac{9ab^{-4}c}{6a^{-5}b^2}\right)^0$

17. Money Matters You can use the formula $P = A\left[\frac{i}{1-(1+i)^{-n}}\right]$ to find the monthly payment on a loan of A dollars that is paid back in equal monthly payments over n months. The variable i represents (annual interest rate ÷ 12). Seki has a $4,000 student loan with an 8% annual interest rate which he is scheduled to pay off in 10 years. Use the formula and a calculator to find Seki's monthly payment.

18. **Standardized Test Practice** Simplify $\frac{(x^2y)^2}{x^{-2}y^2}$.

A $\frac{1}{y}$ **B** x^2 **C** x^2y **D** x^6

Answers: 1. $\frac{1}{xyz^2}$ 2. $\frac{1}{d}$ 3. $\frac{4}{a^7}$ 4. n^4 5. g^2h^2 6. $\frac{1}{8s}$ 7. $\frac{v^{11}}{u^4}$ 8. b 9. $-8x^2y^3z^8$ 10. $\frac{g^{20}}{f^4}$ 11. $\frac{2r}{3}$ 12. $-m^3$ 13. $\frac{k^{10}}{49j^{12}}$ 14. $\frac{-2}{a^3b^8}$ 15. $\frac{3t^6}{r^7s^7}$ 16. 1 17. $48.53 18. D