Name Key Period _____ Date _____

Multiplying and Dividing Monomials

Simplify the expressions below. Simplify as much as possible before applying the exponent to the monomial.

1. $\frac{2x^2y}{3x} \cdot \frac{9xy^2}{y^4}$

$\frac{6x^3y^3}{xy^4}$

$\frac{6x^2}{y}$

2. $\frac{4x^3y^3}{2xy} \cdot \frac{5xy^2}{2y}$

$\frac{5x^4y^5}{xy^2}$

$5x^3y^3$

3. $\frac{20x^3y}{4xy^2} \cdot \frac{-6xy}{-x}$

$\frac{-30x^4y^2}{-x^2y^2}$

$30x^2$

4. $(8x^8y^7)^2 \cdot \left(-\frac{3}{6}x^4\right)^3$

$64x^{16}y^{14} \cdot -\frac{1}{8}x^{12}$

$-8x^{28}y^{14}$

5. $\frac{16x^5y^{10}z^8}{32x^{10}y^{12}z^{10}}$

$\frac{1}{2x^5y^2z^2}$

6. $\frac{5x^9y^3z^4}{3xz^5} \cdot \frac{6y^5z}{x^2y^2z^3} \cdot \frac{2x^3z^5}{4xy^2}$

$\frac{5x^{12}y^8z^{10}}{x^4y^4z^8}$

$5x^8y^4z^2$

7. $\left(\frac{-2x^{22}y}{6x^{30}y^5}\right)^3$

$\left(\frac{-1}{3x^8y^4}\right)^3$

$\frac{-1}{27x^{24}y^{12}}$

8. $\left(\frac{12x^{23}y^{84}}{18x^{20}y^{87}}\right)^3$

$\left(\frac{2x^3}{3y^3}\right)^3$

$\frac{8x^9}{27y^9}$

Same exponents so this can be one large multiplication problem to the power of 4.

9. $\left(\frac{18x^{32}y^{58}}{5x^{37}y^{52}}\right)^4 \cdot \left(\frac{-25x^4}{9y^{10}}\right)^4$

$\left(\frac{18x^{32}y^{58}(-25)x^4}{5x^{37}y^{52}9y^{10}}\right)^4$

$\left(\frac{-10x^{36}y^{58}}{x^{37}y^{62}}\right)^4$

$\left(\frac{-10}{xy^4}\right)^4 = \frac{10{,}000}{x^4y^{16}}$

10. $\left(\frac{420x^{108}y^{15}z^3}{840x^{112}y^4z^6}\right)^5$

$\left(\frac{y^{11}}{2x^4z^3}\right)^5$

$\frac{y^{55}}{32x^{20}z^{15}}$

11. $\left(\frac{16x^{24}y^{15}z^{35}}{-8x^{20}y^{15}z^{39}}\right)^5$

$\left(\frac{-2x^4}{z^4}\right)^5$

$\frac{-32x^{20}}{z^{20}}$

12. $\frac{(3x^2y^3)^3}{(-7x^5y^2)^2}$

$\frac{27x^6y^9}{49x^{10}y^4}$

$\frac{27y^5}{49x^4}$

13. $\frac{(-5x^5y^3)^2}{(2x^5y^4)^3}$

$\frac{25x^{10}y^6}{8x^{15}y^{12}}$

$\frac{25}{8x^5y^6}$

14. $\left(\frac{16x^5y}{x^7y^{10}}\right) \cdot \left(\frac{x^{43}y^{52}}{4x^{41}y^{58}}\right)^4$

$\frac{16}{x^2y^9} \cdot \left(\frac{x^2}{4y^6}\right)^4$

$\frac{16}{x^2y^9} \cdot \frac{x^8}{256y^{24}}$

$\frac{x^6}{16y^{33}}$

15. $\left(\frac{-25x^{18}y^{12}}{x^{14}y^{13}}\right) \cdot \left(\frac{x^{100}y^5}{5x^{108}}\right)^2$

$\frac{-25x^4}{y} \cdot \left(\frac{y^5}{5x^8}\right)^2$

$\frac{-25x^4}{y} \cdot \frac{y^{10}}{25x^{16}}$

$\frac{-y^9}{x^{12}}$

16. $\left(\frac{24y^{18}z^5}{18x^2y^{20}}\right)^3 \cdot \left(\frac{15x^{10}y^4}{20z^2}\right)^2$

$\left(\frac{4z^3}{3x^2y^2}\right)^3 \left(\frac{3x^{10}y^4}{4z^2}\right)^2$

$\frac{4^3z^{15} \cdot 3^2x^{20}y^8}{3^3x^6y^6 4^2z^4}$

$\frac{4x^{14}y^2z^{11}}{3}$