Key

Using Properties of Exponents

Name_____

Simplify each expression.

1. $(4^0w^2)^{-5}$

$(w^2)^{-5}$

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

2. $\frac{y^4}{y^{-7}}$

y^{11}

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

x^4

4. $(3^2s^3)^6$

$(9s^3)^6$

9^6s^{18}

5. $(y^4z^2)\cdot(y^{-3}z^{-5})$

$yz^{-3} = \frac{y}{z^3}$

6. $(2m^3n^{-1})(8m^4n^{-2})$

$16m^7n^{-3}$

$\frac{16m^7}{n^3}$

7. $(7c^7d^2)^{-2}$

$7^{-2}c^{-14}d^{-4}$

$\frac{1}{49c^{14}d^4}$

8. $(5g^4h^{-3})^{-3}$

$5^{-3}g^{-12}h^9$

$\frac{h^9}{125g^{12}}$

9. $\frac{x^5y^{-8}}{x^5y^{-6}}$

$x^0y^{-2} = \frac{1}{y^2}$

10. $\frac{16p^0r^{-6}}{4p^{-3}r^{-7}}$

$4p^3r$

11. $\frac{12a^{-3}b^9}{21a^2b^{-5}}$

$\frac{4}{7}a^{-5}b^{14}$

$\frac{4b^{14}}{7a^5}$

12. $\frac{8e^{-4}f^{-2}}{18ef^{-5}}$

$\frac{4}{9}e^{-5}f^3 = \frac{4f^3}{e^5}$

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

$$\frac{2x^6y^3}{2y^3}$$

$$= \boxed{x^6}$$

14. $\frac{4m^4}{-6m^{-1}n^5} \cdot \frac{3n^{-1}}{m^{-2}}$

$$\frac{12m^4n^{-1}}{-6m^{-3}n^5}$$

$$-2m^7n^{-6}$$

$$\boxed{\frac{-2m^7}{n^6}}$$

15. $\frac{(c^4)^3}{4} \cdot \frac{12d^{-6}}{(15cd)^{-1}}$

$$\frac{c^{12}}{4} \cdot \frac{12d^{-6}}{15^{-1}c^{-1}d^{-1}}$$

$$\frac{c^{12}}{4} \cdot \frac{12 \cdot 15cd}{d^6}$$

$$\frac{180c^{13}}{4d^5} = \boxed{\frac{45c^{13}}{d^5}}$$

16. $\frac{w^{-3}}{v^{-5}} \cdot \frac{v^{-5}}{w^{-3}}$

$$\frac{v^5}{w^3} \cdot \frac{w^3}{v^5}$$

$$= \boxed{1}$$

17. $\left(\frac{x^7y^{-2}}{3y^{-3}}\right)^{-2}$

$$\left(\frac{x^7}{3y}\right)^{-2}$$

$$\frac{x^{-14}}{3^{-2}y^{-2}} = \boxed{\frac{9y^2}{x^{14}}}$$

18. $\left(\frac{qr^2s}{3r^4}\right)^{-3}$

$$\left(\frac{qs}{3r^2}\right)^{-3} \frac{q^{-3}s^{-3}}{3^{-3}r^{-6}}$$

$$\boxed{\frac{27r^6}{q^3s^3}}$$

19. $\left[(z^{-2})^2\right]^3$

$$(z^{-4})^3$$

$$z^{-12} = \boxed{\frac{1}{z^{12}}}$$

20. $\left[(b^0)^{-1}\right]^{-2}$

$$\left[1^{-1}\right]^{-2}$$

$$1^{-3} = \frac{1}{1^3} = \frac{1}{1}$$

$$= \boxed{1}$$

Write an expression that makes each statement true.

21. $\frac{(2m^3n^2)^6}{64m^{18}n^{12}} = \frac{?}{} \cdot 4m^{12}n^{-5}$

$$16m^6m^{17}$$

22. $\frac{?}{9x^2y^6z} = \frac{2x}{3y^2}$

$$6x^3y^4z$$