Key

Algebra 2 **3.1 Exponent Rules Worksheet**

Simplify each expression below using exponent rules. Your final answer should not include any negative exponents. You MUST show work in order to receive credit.

1. $x^5 \cdot x^2$ x^7	2. $y^3 \cdot y \cdot y^4$ y^8	3. $b^4 \cdot b^{-4}$ $b^0 = 1$
4. $7x^3y^2 \cdot 5xy^9$ $35x^4y^{11}$	5. $a^{10} \cdot a^2 \cdot a^{-6}$ a^6	6. $(z^5)^5$ z^{25}
7. $(b^7)^2$ b^{14}	8. $(m^{-8})^{-3}$ $m^{+24} = \frac{1}{m^{24}}$	9. $(x^2y^4m^3)^8$ $x^{16}y^{32}m^{24}$
10. $(3x^2)^4$ $3^4x^8 = 81x^8$	11. $(2ab)^5$ $2^5a^5b^5$ $= 32a^5b^5$	12. $(2x^3y)^6$ $2^6x^{18}y^6$ $64x^{18}y^6$
13. $(m^7)^4 \cdot m^3$ $m^{28} \cdot m^3$ m^{31}	14. $p^2 \cdot (p^5)^2$ $p^2 \cdot p^{10}$ p^{12}	15. $\frac{x^5}{x^2}$ x^3
16. $\frac{c^4}{c^8} = c^{-4}$ $= \frac{1}{c^4}$	17. $\frac{5x^{-4}}{x^{-9}}$ $5x^{(-4--9)}$ $5x^5$	18. $\frac{x^3 \cdot x^4}{x^2}$ $\frac{x^7}{x^2}$ $= x^5$

19. $\left(\frac{6}{z^4}\right)^3$ $\frac{216}{z^{12}}$	20. $\left(\frac{a^3}{b^5}\right)^4$ $\frac{a^{12}}{b^{20}}$	21. $\left(\frac{3x^4}{y^6}\right)^5$ $\frac{243x^{20}}{y^{30}}$ — Wondering if it should be y^{30}?
22. $\left(\frac{m^4}{5n^9}\right)^3$ $\frac{m^{12}}{125n^{27}}$	23. $\left(\frac{3x^7}{2y^{12}}\right)^4$ $\frac{81x^{28}}{16y^{48}}$	24. $(8m)^0$ $= 1$
25. $5x^0y^5$ ~~5x~~ $5y^5$	26. $2x^{-2}$ $\frac{2}{x^2}$	27. $5m^{-3}n^4$ $\frac{5n^4}{m^3}$
28. $3x^{-2}y^{-5}$ $\frac{3}{x^2y^5}$	29. $(x^{-2}y^2)^{-3}$ $x^{+6}y^{-6}$ $= \frac{1x^6}{y^6}$	30. $(4x^4y^{-3})^{-2}$ $4^{-2}x^{-8}y^{+6}$ $\frac{1y^6}{16x^8}$
31. $(f^{-3}g^5h^8)^{-3}$ $f^{+9}g^{-15}h^{-24}$ $\frac{f^9}{g^{+15}h^{24}}$	32. $(x^2)^4 \cdot 3x^5$ $x^8 \cdot 3x^5$ $3x^{13}$	33. $(3x^3)^2 \cdot (2x)^3$ $9x^6 \cdot 8x^3$ $72x^9$

34. $(5x^2y^3)^2 \cdot (2x^3y^4)^3$

$(25x^4y^6)(8x^9y^{12})$

$= 200x^{13}y^{18}$

35. $\frac{x^8}{2y} \cdot \frac{5y^2}{x^3}$ $\quad \frac{5x^8y^2}{2x^3y}$

$= \frac{5x^5y}{2}$

36. $\frac{x^3y}{xy^5} \cdot \frac{x^2y^9}{x^8}$ $\quad \frac{x^5y^{10}}{x^9y^5}$

$= \frac{y^5}{x^4}$

37. $\left(\frac{r^2t^{-3}}{r^{-3}t^5}\right)^{-8} = \frac{r^{-16}t^{24}}{r^{24}t^{-40}}$

$= \frac{t^{64}}{r^{40}}$

38. $\left(\frac{x^4y^{-7}}{x^{-2}y^4}\right)^2$ $\quad \frac{x^8y^{-14}}{x^{-4}y^8}$

$= \frac{x^{12}}{y^{22}}$

39. $\left(\frac{x^{-3}y^{-8}}{x^4y^{-2}}\right)^{-7}$ $\quad \frac{x^{21}y^{56}}{x^{-28}y^{14}}$

$= x^{49}y^{42}$

40. $\left(\frac{m^3p^5}{n^7}\right)^6 \cdot \left(\frac{m^2n^0p^3}{m^4n^2}\right)^3$ $\quad \left(\frac{m^{18}p^{30}}{n^{42}}\right)\left(\frac{m^6p^9}{m^{12}n^6}\right)$

$= \frac{m^{24}p^{39}}{m^{12}n^{48}} = \frac{m^{12}p^{39}}{n^{48}}$

BONUS: $(5x^7y^3z^{-1})^2 \cdot (2xy^{-5})^3 \cdot (2y^{-3}z^2)^3$

$25x^{14}y^6z^{-2} \cdot 8x^3y^{-15} \cdot 8y^{-9}z^6$

$= \frac{1600x^{17}z^4}{y^{18}}$