1. Simplify: $y^3\left(y^2y^4\right)$
2. Simplify: $4x^2\left(3x^5\right)$
3. Simplify: $\left(-4x^3\right)\left(-5x\right)$
4. Simplify: $\left(a^3\right)^7$
5. Simplify: $\left(2y^3y\right)^2\left(y^2\right)^2$
6. Simplify: $\left(-3x^2y^4z\right)^2$
7. Simplify: $\left(\frac{x^2}{y^3}\right)^5$
8. Simplify: $\left(\frac{-2a}{b}\right)^5$
9. Simplify: $\frac{b^4b^5}{b^2b^3}$
10. Simplify: $\frac{18\left(x^3y^2\right)\left(xy^3\right)}{6(x^2y^2)(xy^2)}$
11. Simplify: $\frac{20\left(r^4s^3\right)^4}{6(rs^3)^3}$
12. Simplify: $\left(\frac{y^3y}{2yy^2}\right)^3$
13. Simplify: x^{-2}
14. Simplify: $(2y)^{-4}$
15. Simplify: $\left(x^2y^{-3}\right)^{-4}$
16. Simplify: $\left(m^2n^3\right)^{-2}$
17. Simplify: $\frac{x^{12}x^{-7}}{x^3x^4}$
18. Simplify: $\left(\frac{x^5}{y^{-2}}\right)^{-2}$
19. Simplify: $\left(\frac{-2x^4x^{-3}}{x^{-3}x^7}\right)^2$
20. Simplify: $\frac{\left(2x^{-2}\right)^{-2}}{4\left(x^2y\right)^{-1}}$
21. Evaluate without using a calculator: $(-27)^{-\frac{2}{3}}$
22. Evaluate without using a calculator: $(8)^{\frac{4}{3}}$
23. Evaluate without using a calculator: $-16^{-\frac{3}{2}}$
24. Evaluate without using a calculator: $-\left(\frac{1}{64}\right)^{\frac{5}{6}}$
25. Simplify: $(a^{-1/2}b)(a^{3/4}b^{1/2})$
26. Simplify: $\frac{z^{1/2}}{z^{1/3}}$
27. Simplify: $\frac{x^{1/2}y^{-2}}{xy^{1/2}}$
28. Simplify: $\left(\frac{48a^6}{27b^8}\right)^{-1/2}$
29. Simplify, then write your answer in scientific notation: $\left(3.4\times10^{-3}\right)\left(2.1\times10^4\right)$
30. Simplify, then write your answer in scientific notation: $\frac{9.3\times10^2}{3.1\times10^{-2}}$
31. The distance from Mercury to the sun is approximately 3.6×10^7 miles. Use scientific notation to express this distance in feet. (5280 feet = 1 mile.)