1. Simplify: $y^3 \left(y^2 y^4\right) = y^9$

2. Simplify: $4x^2 \left(3x^5\right) = 12x^7$

3. Simplify: $\left(-4x^3\right)\left(-5x\right) = 20x^4$

4. Simplify: $\left(a^3\right)^7 = a^{21}$

5. Simplify: $\left(2y^3 y\right)^2 \left(y^2\right)^2 = 4y^{12}$

6. Simplify: $\left(-3x^2 y^4 z\right)^2 = 9x^4 y^8 z$

7. Simplify: $\left(\frac{x^2}{y^3}\right)^5 = \frac{x^{10}}{y^{15}}$

8. Simplify: $\left(\frac{-2a}{b}\right)^5 = \frac{-32a^5}{b^5}$

9. Simplify: $\frac{b^4 b^5}{b^2 b^3} = b^4$

10. Simplify: $\frac{18\left(x^3 y^2\right)\left(xy^3\right)}{6\left(x^2 y^2\right)\left(xy^2\right)} = 3xy$

11. Simplify: $\frac{20\left(r^4 s^3\right)^4}{6\left(rs^3\right)^3} = \frac{10r^{13}s^3}{3}$

12. Simplify: $\left(\frac{y^3 y}{2yy^2}\right)^3 = \frac{y^3}{8}$

13. Simplify: $x^{-2} = \frac{1}{x^2}$

14. Simplify: $\left(2y\right)^{-4} = \frac{1}{16y^4}$

15. Simplify: $\left(x^2 y^{-3}\right)^{-4} = \frac{y^{12}}{x^8}$

16. Simplify: $\left(m^2 n^3\right)^{-2} = \frac{1}{m^4 n^6}$

17. Simplify: $\frac{x^{12} x^{-7}}{x^3 x^4} = \frac{1}{x^2}$

18. Simplify: $\left(\frac{x^5}{y^{-2}}\right)^{-2} = \frac{1}{x^{10} y^4}$

19. Simplify: $\left(\frac{-2x^4 x^{-3}}{x^{-3} x^7}\right)^2 = \frac{4}{x^6}$

20. Simplify: $\frac{\left(2x^{-2}\right)^{-2}}{4\left(x^2 y\right)^{-1}} = \frac{x^6 y}{16}$

21. Evaluate without using a calc: $\left(-27\right)^{-\frac{2}{3}} = \frac{1}{9}$

22. Evaluate without using a calc: $\left(8\right)^{\frac{4}{3}} = 16$

23. Evaluate with no calc: $-16^{-\frac{3}{2}} = -\frac{1}{64}$

24. Evaluate with no calc: $-\left(\frac{1}{64}\right)^{\frac{5}{6}} = -\frac{1}{32}$

25. Simplify: $\left(a^{-1/2} b\right)\left(a^{3/4} b^{1/2}\right) = a^{1/4} b^{3/2}$

26. Simplify: $\frac{z^{1/2}}{z^{1/3}} = z^{1/6}$

27. Simplify: $\frac{x^{1/2} y^{-2}}{xy^{1/2}} = \frac{1}{x^{1/2} y^{5/2}}$

28. Simplify: $\left(\frac{48a^6}{27b^8}\right)^{-1/2} = \frac{3b^4}{4a^3}$

29. Simplify, then write your answer in sci. not.: $\left(3.4 \times 10^{-3}\right)\left(2.1 \times 10^4\right) = 7.14 \times 10^1$

30. Simplify, then write your answer in scientific notation: $\frac{9.3 \times 10^2}{3.1 \times 10^{-2}} = 3 \times 10^4$

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.)$= 1.9008 \times 10^{11}$ feet