4. Solve for x in each of the following.

(a) $\log_2 x = 4$ (b) $\log_3 9 = x$ (c) $\log_4 x = \frac{1}{2}$

(d) $\log_x 3 = \frac{1}{2}$ (e) $\log_x 2 = 4$ (f) $\log_5 x = 3$

(g) $\log_x 16 = 2$ (h) $\log_x 81 = 2$ (i) $\log_x\left(\frac{1}{3}\right) = 3$

(j) $\log_2(x-5) = 4$ (k) $\log_3 81 = x+1$ (l) $\log_3(x-4) = 2$

5. Solve the following equations

(a) $\log_2(x+1) - \log_2 x = \log_2 3$

(b) $\log_{10}(x+1) - \log_{10} x = \log_{10} 3$

(c) $\log_2(x+1) - \log_2(x-1) = 4$

(d) $\log_{10}(x+3) - \log_{10} x = \log_{10} x + \log_{10} 2$

(e) $\log_{10}(x^2+1) - 2\log_{10} x = 1$

(f) $\log_2(3x^2+28) - \log_2(3x-2) = 1$

(g) $\log_{10}(x^2+1) = 1 + \log_{10}(x-2)$

(h) $\log_2(x+3) = 1 - \log_2(x-2)$

(i) $\log_6(x+5) + \log_6 x = 2$

(j) $\log_3(x-2) + \log_3(x-4) = 2$

(k) $\log_2 x - \log_2(x-1) = 3\log_2 4$

(l) $\log_{10}(x+2) - \log_{10} x = 2\log_{10} 4$

7. Solve the following

(a) $\log_2(x+7) + \log_2 x = 3$ (b) $\log_3(x+3) + \log_3(x+5) = 1$

(c) $\log_{10}(x+7) + \log_{10}(x-2) = 1$ (d) $\log_3 x + \log_3(x-8) = 2$

(e) $\log_2 x + \log_2 x^3 = 4$ (f) $\log_3 \sqrt{x} + 3\log_3 x = 7$

8. Solve for x.

(a) $\log_2 x^2 = (\log_2 x)^2$ (b) $\log_3 x^3 = (\log_3 x)^3$

(c) $\log_4 x^4 = (\log_4 x)^4$ (d) $\log_5 x^5 = (\log_5 x)^5$

Investigate the solution to $\log_n x^n = (\log_n x)^n$