Worksheet 4.1 - 4.2

1. Determine whether or not \( f(x) \) is one to one function and if so, find \( f^{-1}(x) \):
   
   a. \( f(x) = 2x + 3 \)

   b. \( f(x) = 4 + x^3 \)

   c. \( f(x) = \sqrt{2x + 1} \). Specify the domain of \( f^{-1}(x) \)

2. Show that \( f(x) = x^2 + 4x + 9 \) is not one to one function. Modify the domain of \( f(x) \) so that it will be a one to one function (Hint: use \( f'(x) \))

3. Consider \( f(x) = \frac{2x+3}{4x-2} \)
   
   a. Show that \( f(x) \) is its own inverse.
b. What does the result above tell you about the graph of $f^{-1}(x)$?

4. Find the exact value of $\log_2{32}$ without using calculator:

5. Find the exact value of $\log_{\sqrt{6}}{6}$ without using calculator:

6. Show that $\log_a{\frac{6}{5}} - \log_a{300} + \log_a{125} = -\log_a{2}$

7. Solve for $x$ if $\log_{10}(x+1) - \log_{10}(x-2) = 1$.

8. Expand the logarithm in terms of sums, differences, and multiplies of simpler logarithms:
   a. $\log\left(\frac{x^3\sqrt{x-2}}{x+4}\right)$
   b. $\log\left(\sqrt[3]{\frac{x^2}{x^3+4}}\right)$