1. [8 points] For both parts of this question, please leave your answers in exact form and show all your work.

   a. [3 points] Find all values of $w$ satisfying the following equation.

      $\ln(10w + 3) = 8$.

      Solution: Take the base $e$ exponential of both sides to get
      
      $$10w + 3 = e^8.$$  

      We can then solve this for $w$ as follows:
      
      $$10w = e^8 - 3$$
      
      $$w = \frac{e^8 - 3}{10}.$$  

   b. [5 points] Find all values of $x$ with $-2 \leq x \leq 1$ satisfying the following equation.

      $$4 \tan \left( \frac{2\pi}{3} x \right) = 5.$$  

      Solution: To find the principal solution, we solve
      
      $$\tan \left( \frac{2\pi}{3} x \right) = 5/4,$$
      
      $$\frac{2\pi}{3} x = \tan^{-1}(5/4).$$
      
      Hence,
      
      $$x = \frac{3}{2\pi} \tan^{-1}(5/4) \approx 0.428.$$  

      To find the other solutions, observe that the period of the function is $\pi \cdot \frac{3}{2\pi} = 3/2$. Hence, we also have a solution at
      
      $$x = \frac{3}{2\pi} \tan^{-1}(5/4) - \frac{3}{2}.$$  

      $$x = \frac{3}{2\pi} \tan^{-1}(5/4), \quad \frac{3}{2\pi} \tan^{-1}(5/4) - \frac{3}{2}.$$  