1. Solve the exponential equations. Record the solutions as an exact values and as approximate values rounded to the nearest thousandth.

   i. \(100 - 5(3)^x = 84\)   \(\Rightarrow\) \(x = \frac{\ln(16)}{\ln(3)}\)   \(\approx 2.634\)  

   ii. \(9.25e^{0.002x} = 37\)  

   \(\Rightarrow\) \(x = \frac{\ln(37/9.25)}{0.002}\)  

   \(\approx 100.00\)  

   iii. \(4^{-3x} = 0.1\)  

   \(\Rightarrow\) \(x = \frac{-\ln(0.1)}{-3\ln(4)}\)  

   \(\approx 0.381\)  

   iv. \(1000e^{-4x} + 25 = 100\)  

   \(\Rightarrow\) \(e^{-4x} = 0.75\)  

   \(\Rightarrow\) \(x = \frac{-\ln(0.75)}{-4}\)  

   \(\approx 0.389\)  

2. Solve the logarithmic equations. Record the solutions as an exact values and as approximate values rounded to the nearest thousandth.

   i. \(\log_2 5x = -3\)  

   \(\Rightarrow\) \(5x = 2^{-3}\)  

   \(\Rightarrow\) \(x = \frac{2^{-3}}{5}\)  

   \(\approx 0.032\)  

   ii. \(\log (x + 15) = 0.5\)  

   \(\Rightarrow\) \(x + 15 = 10^{0.5}\)  

   \(\Rightarrow\) \(x = 10^{0.5} - 15\)  

   \(\approx -10.625\)  

   iii. \(\ln x + 1 = 0\)  

   \(\Rightarrow\) \(\ln x = -1\)  

   \(\Rightarrow\) \(x = e^{-1}\)  

   \(\approx 0.368\)  

   iv. \(\ln \sqrt{x} - 8 = 5\)  

   \(\Rightarrow\) \(\ln x = 13\)  

   \(\Rightarrow\) \(x = e^{13}\)  

   \(\approx 2.176 \times 10^5\)  

3. Solve the following inequalities.

   i. \(x^2 - 6x + 9 < 16\)  

   \(\Rightarrow\) \(x^2 - 6x - 7 < 0\)  

   \(\Rightarrow\) \(x \in (-1, 7)\)  

   ii. \(x^3 - 5x^2 - x \geq -5\)  

   \(\Rightarrow\) \(x^3 - 5x^2 - x + 5 \geq 0\)  

   \(\Rightarrow\) \(x \in (-\infty, -1] \cup [2, \infty)\)  

   iii. \(\frac{1}{x} < \frac{1}{x + 4}\)  

   \(\Rightarrow\) \(1 - \frac{1}{x + 4} < 0\)  

   \(\Rightarrow\) \(x < -3\)  

   iv. \(\frac{x + 12}{x + 2} - 3 \geq 0\)  

   \(\Rightarrow\) \(\frac{x + 12}{x + 2} \geq 3\)  

   \(\Rightarrow\) \(x + 12 \geq 3(x + 2)\)  

   \(\Rightarrow\) \(x \geq -1\)