2. [7 points]
   a. [3 points] Let \( f(x) = \ln(x) \) and let \( g \) be the function whose graph is obtained by performing the following transformations to the graph of \( f \), in the following order:
      1) A horizontal stretch by a factor of 3.
      2) A horizontal shift to the left by 1.
      3) A vertical compression by factor of \( \frac{1}{5} \).
   Write down a formula for \( g(x) \)
   
   Solution: \( g(x) = \frac{1}{5} \ln \left( \frac{1}{3} x(x + 1) \right) \)

   b. [4 points] The graph \( y = K(x) \) has the line \( y = 2 \) as its horizontal asymptote and a horizontal intercept at \( (1, 0) \). Let \( H \) be the function given by the formula \( H(x) = -\frac{1}{7} K(2x+3) \). Find the horizontal intercept and the equation of the horizontal asymptote of the graph \( y = H(x) \).

   Solution: Horizontal asymptote: \( y = -\frac{2}{7} \).
   Horizontal intercept: \( (-1, 0) \)

3. [6 points]
   a. [4 points] Let \( a \) be a non-zero number. Find the zeroes of the polynomial \( 3x(x^2 + ax)^2 \) and indicate if each zero is a double zero or a triple zero.

   Solution: \( p(x) = 3x^3(x + a)^2 \). Zeros: \( x = 0 \) (triple zero) and \( x = -a \) (double zero).

   b. [2 points] Let \( f \) and \( g \) be functions given by the formulas

   \[
   f(x) = \sqrt{1 + 7\sqrt{x}} \quad \text{and} \quad h(x) = \sqrt{x}.
   \]

   If \( g \) is a function such that \( f(x) = g(h(x)) \), find a formula for \( g(x) \).

   Solution: Since \( f(x) = \sqrt{1 + 7\sqrt{x}} = \sqrt{1 + 7h(x)} \), then \( g(x) = \sqrt{1 + 7x} \).