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 \( g(x) \)
   \[ Solution: \quad g(x) = \frac{1}{5} \ln \left( \frac{1}{3} x (x + 1) \right) \]

   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 \( y = H(x) \).
   \[ Solution: \quad \text{Horizontal asymptote: } y = -\frac{2}{7}. \]
   \[ \text{Horizontal intercept: } (-1, 0) \]

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.
   \[ Solution: \quad p(x) = 3x^3(x + a)^2. \text{ Zeros : } x = 0 \text{ (triple zero)} \text{ and } x = -a \text{ (double zero)} \]

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