Calculus I  Chapter 1 Practice Problems  Name Solution Key

1. Use your calculator to find the value for x accurate to 2 decimal places for each of the following triangles:
   a) \[ x = 57.3^\circ \]
   b) \[ x = 69.81^\circ \]

2. a) Write equations defining the piecewise function graphed on the right.
   b) Sketch the graph for \( y = -f(x + 1) \) on the same axes.

3. The graph of \( y = f(x) \) is shown on the left.
   a) Plot the graph of \( y = f^{-1}(x) \) (inverse) and
   b) Plot the graph of \( y = 1 / f(x) \) on the same axes.

4. If \( g(x) = \begin{cases} 
1-x, & x \leq 1 \\
1 + \frac{1}{x}, & x > 1 
\end{cases} \) and \( f(x) \) is defined by the table
   \[
   \begin{array}{c|cccc}
   x & 0 & 1 & 2 & 3 \\
   f(x) & 3 & 2 & 1 & 5 \\
   \end{array}
   \]
   then find a) \( (g \circ f)(0) \),  b) \( g(f(2)) \),  c) \( (f \circ f)(1) \),  d) \( (g + f)(2) \).

5. If \( f(x) = \sqrt{1-x} \) and \( g(x) = \cos(x) \)
   (a) find \( (f \circ g)(x) \) and state its domain and range, and
   \[
   \sqrt{1 - \cos^2(x)} ; \quad D = (-\infty, \infty) ; \quad R = [0, 1] 
   \]
   (b) find \( (g \circ f)(x) \) and state its domain and range.

6. Find the formula for and graph the 3rd degree polynomial satisfying
   \( f(-1) = f(1) = f(2) = 0; f(0) = -1 \).

7. Use your calculator to graph \( y = x^2 \) and \( y = x^2 - 1 \) on the same axes and determine any points of intersection to 1 decimal place.

8. (a) Find the exponential function of the form \( y = Ce^x \) going through the points \( (1, 2) \) and \( (2, 1) \).
   \( y = 4 \left( \frac{1}{2} \right)^x \)
   (b) A rancher has 100 cattle. The herd doubles every 3 years. How many cattle will there be in 9 years? How many cattle will there be in 10 years? How many cattle will there be in 50 years?
   \( P(t) = 100 \cdot 2^{\frac{t}{3}} \)

9. a) If \( \log_a(x) = 2 \) and \( \log_a(y) = 3 \), find \( \log_a(x / y^2) = -4 \).
   b) Solve for \( x \) if \( -10 = 2 + 5(1 - e^{-x}) \).
   \[ x \approx -1, 2.2 \]