Name _____

1. For $f(x) = 4 - 2x^2 + \dfrac{1}{6}x^4$

  a. Find $f'(x) =$
  b. List intervals where the function is increasing/decreasing
  c. List the local minimum(s) and maximum(s) of the function
  d. Find $f''(x) =$
  e. List intervals where the function is concave up/concave down.
  f. Find points of inflection.
  g. Calculate the y-intercept and other points. Find the x-intercepts if you can.
  h. Now graph the function.

2. Find the derivative of f(g(x)).

  a. f(u) = sin(u), g(x) = 2x+1   b. f(u) = 2u + 1, g(x) = sin x

3. Find the derivative of the following functions.

  a. $y = \sin(x^5)$ b. $y = \sin^5(x)$

  c. $f(t) = \sqrt{1 - t^2}$ d. $g(t) = (t^2 + 3t + 1)^{-5/2}$

  e. $y = (x^4 - x^3 - 1)^{2/3}$ f. $y = \cos(4u^2 + 9)$

  g. $f(x) = \dfrac{1}{\sqrt{\cos(x^2) + 1}}$ h. $g(x) = (\sqrt{x+1} - 1)^{3/2}$

  i. $y = \sin(x^2 + 4x)$ j. $g(x) = \sin(\cos(\sin x))$

  k. $f(x) = \left(1 + (x^2 + 2)^5\right)^3$ l. $y = \left(\dfrac{1}{x+1}\right)^3$