

## MATH 215 WORKSHEET #9.25

- (1) Compute the derivatives of the following:
  - (a)  $f(x) = \sec(x^3 + 2)$
  - (b)  $g(x) = \sqrt{\sin x^2}$
  - (c)  $j(x) = \cos(\sin x)$
  - (d)  $k(x) = \cos x \sin x$
- (2) The spawner-recruit function for geckos is  $f(S) = 1.2S - .001S^2$ . Find the maximum sustainable harvest for your cat.
  
- (3) The amount of pollen collected by a bee in  $t$  minutes at a flower is  $F(t) = \frac{t}{1+t}$ . It takes an average of  $\tau = 5$  minutes to fly from flower to flower. Find the amount of time  $t$  that maximizes the rate of collection  $R(t) = \frac{F(t)}{t+\tau}$ .
  
- (4) Find the local maxima, minima, and intervals where the function  $g(x) = x + \sin x$  is increasing and decreasing.
- (5) Find the critical points of the function  $h(x) = 4x^3 - 2x$ , determine if they are local minima or maxima. Also, determine the inflection points of the function (if any) and where the function is concave up and concave down.
- (6) Find the critical points of the function  $f(x) = 4x^2 - x^4$ . Determine which of the critical points are maxima and minima.