1. Find the maximum and minimum values of

$$h(\theta) = 3\sin(\theta), \qquad 0 \le \theta \le 2\pi$$

2. The population p of a species at time t is given by the equation

$$p(t) = At^3(B - t), \qquad 0 \le t < 2B$$

   where A and B are positive constants. At what time will the population reach its maximum?

For problems 3 to 4: answer the following for each of the given functions.

   (a) State the first and second derivative of the function. (You do not need to show your work.)
   (b) Find the critical points.
   (c) Find the interval(s) of increase and/or decrease.
   (d) Find the interval(s) where the function is concave up and/or concave down.
   (e) Find the point(s) of inflection (if any).
   (f) Use an appropriate *derivative test* to determine any maximum or minimum values. This means you must clearly indicate which test you are applying by name. Be sure to also state whether the value(s) are a local max/min or an absolute max/min.

3. $f(x) = (1 - x)e^{2x}$

4. $g(x) = \dfrac{x^2}{x - 1}$