1. (2 points each) Indicate if the following statements are **always** true, T. If a statement is never true or only sometimes true indicate it is false, F.

   (a) If $f(a) < f(x)$ for all x in $[a, b]$, then $f(x)$ is increasing on $[a, b]$.

   T **F**

   (b) Every function has a global maximum on a closed interval $[a, b]$.

   T **F**

   (c) $\int_a^b g(x)^2 dx = \left(\int_a^b g(x) dx \right)^2$

   T **F**

   (d) If $f'(x) = g'(x)$ for all x and $f(0) = g(0)$, then $f(x) = g(x)$.

   T F

   (e) A continuous, differentiable function, g, with three critical points in the range $0 \leq t \leq 10$ has at least four changes in concavity.

   T **F**

   (f) The function $p(t) = \frac{c}{3} t^3 + Ac$ (A and c constants) is an antiderivative of $q(t) = c\, t^2$.

   T F