Show all work and explanations for full credit.

1) Given f(x) = . Show that the maximum value of f(x) occurs at

x = π/(4α)

Let s(*t*) =  be the position function of a particle, where *g* is the acceleration of gravity on earth, *v*0 is the particles initial velocity, and *h*0 is the particles initial height.

2) Find the velocity of the particle as a function of time.

3) Find the value of t when the particle has reached its maximum height.

4) If the particle starts on the ground (i.e. *h*0 = 0), verify that the maximum height of the particle is 