Math 120U
Quiz 3

1. Let $f(x) = 3x - \sqrt{x}$ and $g(x) = x^2$. Find and simplify:
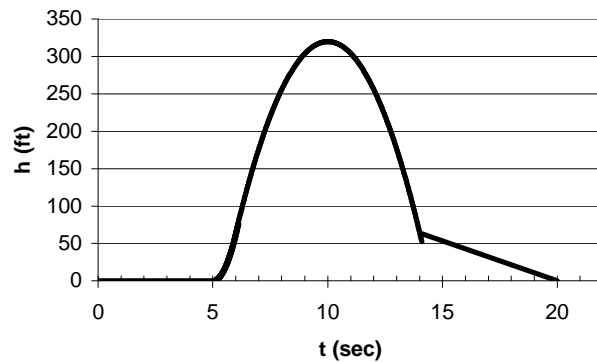
a) $g(y^3 - 2)$

b) $g(f(x))$

c) $f(g(2))$

2. Find the vertex (i.e. the point (x,y)) of the parabola $y = 9x^2 - 6x + 4$.

More on the back.

3. The goal of this problem is to find a multipart function for the graph to the right. A carnival ride operates by tossing a platform filled with people up into the air and letting them fall down (safely, of course.) The ride operates as follows (refer to the picture): At t=0, the passengers' seats lock. Five seconds later, a spring beneath the platform is released and pushes the platform upwards, so that their height in feet *for the next second* is given by $h(t) = 64t^2 - 640t + 1600$, where t is in seconds.

One second after the spring is released, when the platform is at a height of 64 feet, the platform lifts off the spring. The platform's height function then takes the path of a parabola. It hits it's maximum height of 320 feet at t=10. At t=14, when the platform is at 64 feet, a safety catch kicks in and the platform starts traveling *downward* at a constant speed of $\frac{32}{3}$ ft/sec until it touches the ground.

   Find a multipart function h(t) that gives the height of the platform after t seconds. (Hint: First find the different time intervals each part has as its domain. Then fill in the function rules for the parts that are given. You will have to find the equation of a parabola and a line. Your multipart function will have four parts.)

More on the back.