6. [13 points] Anderson and Glen decide to take a road trip starting from Venice Beach. They have no worries about getting anywhere quickly, as they enjoy each other’s company, so they take a very inefficient route. Suppose that Venice Beach is located at (0, 0) and that Anderson and Glen’s position (x, y) (measured in miles) t hours after leaving Venice Beach is given by a pair of parametric equations \(x = f(t), \ y = g(t)\). A graph of \(f(t)\) and a formula for \(g(t)\) are given below. Note that \(f(t)\) is linear on the intervals \([0, 0.5], [0.5, 1.5],\) and \([2.5, 3]\).

\[
\begin{align*}
f(t) & = 3t - 1.5 \quad (0 \leq t \leq 1) \\
g(t) & = -t^3 + 5t^2 - 3t
\end{align*}
\]

**Note:** For each of the following, your final answer should not involve the letters \(f\) and \(g\).

a. [2 points] If their roadtrip last 3 hours, what are the \(x\)– and \(y\)– coordinates of their final destination?

b. [3 points] At what speed are they traveling 2 hours into their trip?

c. [4 points] Write, but do not compute, an expression involving one or more integrals that gives the distance they traveled, in miles, in the first half hour of their trip.

d. [4 points] Write down a pair of parametric equations using the parameter \(s\) for the line tangent to their path at \(t = 2.75\) hours.

**Answer:** \(x(s) = \) and \(y(s) = \)