Math 125 Autumn 2002 **Quiz #2** **Answers**

1. (3 points) Evaluate the following integrals:

   (a)(1 point) $\int \sqrt{2x+1}dx$.

   ANS: $\frac{1}{3}(2x+1)^{\frac{3}{2}}+C$.

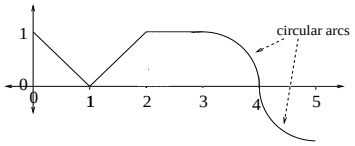
   (b)(1 point) $\int_0^{\frac{\pi}{2}} \sin(x)\cos(x)dx$.

   ANS: $\frac{1}{2}$.

   (c)(1 point) $\int_0^1 f(x^2)xdx$ if $\int_0^1 f(x)dx = 7$.

   ANS: $\frac{7}{2}$.

2. (3 points) Below is the graph of f as a function of t



   Define $g(x) = \int_0^x f(t)dt$.

   (a)(1 point) Find the values of g and g' at the numbers 0, 1, 2, 3, 4 and 5.

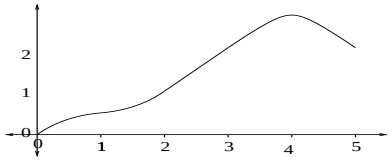
   ANS: $g(0) = 0$, $g(1) = \frac{1}{2}$, $g(2) = 1$, $g(3) = 2$, $g(4) = 2 + \frac{\pi}{4}$, $g(5) = 2$, $g'(0) = 1$, $g'(1) = 0$, $g'(2) = 1$, $g'(3) = 1$, $g'(4) = 0$ and $g'(5) = -1$.

   (b)(1 point) Find the largest interval on which g is increasing.

   ANS: $(0, 4)$.

   (c)(1 point) Sketch a graph of $g(x)$.

   ANS:



3. (4 points) A child is playing with a lawn dart on a third story balcony. The child throws the dart directly upward. After 1 second the dart passes the point from which it was thrown on its way down (narrowly missing the child). After 1 more second the dart hits the sidewalk (narrowly missing an irresponsible parent). Recall that on earth $g = -32\frac{\text{feet}}{(\text{seconds})^2}$.

   (a) Find an equation for the height of the dart as a function of time (possibly including constant parameters).

   ANS: $s(t) = -16t^2 + Ct + D$ feet.

   (b) How high is the balcony (the point from which the dart was thrown)?

   ANS: 32 feet ($C = 16$).

   (c) What is the total distance (up and then down) that the dart traveled?

   ANS: 40 feet.