

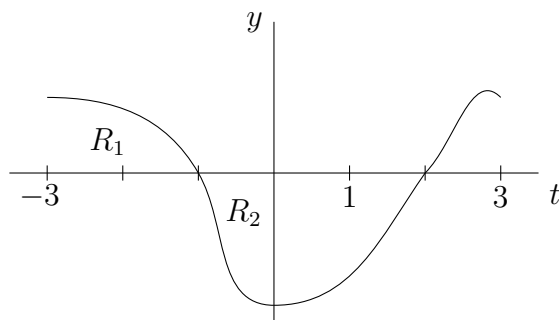
Exam 2

Wednesday, November 7, 2012

Name: _____

Show all significant work and justify all your answers. This is a closed book exam. Use your own paper and/or the paper provided by the instructor. You have 50 minutes to work on the following 3 problems. Relax.

1. Figure 1 shows a sketch of the graph of a function, f , defined over the interval

Figure 1: Sketch of graph of f

$[-3, 3]$ on the t -axis. Define the area function $F(x) = \int_{-3}^x f(t) dt$, for x in the interval $[-3, 3]$.

- Determine values of x in the interval $[-3, 3]$ for which (i) $F(x)$ increases; (ii) $F(x)$ decreases. Justify your answers.
 - Assume that the regions labeled R_1 and R_2 in Figure 1 have exactly the same area. Sketch the graph of $y = F(x)$ over the interval $[-3, 3]$ on the x -axis.
2. For each of the following functions, f , evaluate $F(x) = \int_a^x f(t) dt$, for the given point a .
- $f(t) = 3 + \cos t + 2 \sin t$, for all $t \in \mathbf{R}$, and $a = 0$.
 - $f(t) = t + \frac{1}{t}$, for $t > 0$, and $a = 1$. Give the domain of F in this case.
3. Compute the area of the region in the ty -plane that lies below the curve given by $y = 2 - t^2$ and above the graph of $y = t^2$.