

Math 1A Worksheet 30

April 30th, 2008

- Suppose a population has size 10 at time $t = 0$ and grows with a doubling time of 1 year.
 - Find the size of the population after 10 years.
 - Find the average size of the population between times $t = 0$ and $t = 10$ years. [Note: knowing the correct definition of the average here is the *whole point* of this problem. So please be sure you know.]
- Let $g(x) = \int_{-1}^x |t| dt$.
 - Find an explicit formula for $g(x)$ for $-1 < x < 0$ and $0 < x < 1$.
 - Graph $g(x)$ for $-1 < x < 1$.
 - Find $g'(x)$ and $g'(0)$.
 - Does $g''(0)$ exist?

- Suppose

$$y = \int_{\cos x}^{x^2} \cos(u^2) du.$$

Find $\frac{dy}{dx}$.

- If f is a continuous function and g and h are differentiable functions, find

$$\frac{d}{dx} \int_{g(x)}^{h(x)} f(t) dt.$$

- Find

$$\lim_{t \rightarrow 0^+} \int_t^1 t \frac{\cos y}{y} dy.$$