

You may use a calculator and your homework, but not your books or notes. There are two (2) problems worth 10 points each. **Show all of your work to receive full/partial credit.**

- 1) (#37 from 5.2) Find the indefinite integral.

$$\int \frac{\cos t}{1 + \sin t} dt$$

$$u = 1 + \sin x$$

$$du = \cos x dx$$

$$\int \frac{du}{u} = \ln|u| + C$$

$$= \ln|1 + \sin x| + C$$

- 2) (#23 from 5.3) Use the derivative to determine whether the function is strictly monotonic on its entire domain and therefore has an inverse.

$$f(x) = 2 - x - x^3$$

$$f'(x) = -1 - 3x^2 \leftarrow \text{set } = 0$$

$$-3x^2 = 1 \rightarrow x^2 = -\frac{1}{3}$$

No solution, so no critical numbers.

$f'$  is always negative, so

$f$  is strictly monotonic (decreasing)