

1. [12 points]

For the following statements, select True if the statement is *ALWAYS* true, and select False otherwise. No explanations are required.

a. [2 points]

If  $f$  is a differentiable function and  $\frac{f(5.1)-f(5)}{0.1} = -3$ ,  
then  $f'(5) = -3$ .

True

False

b. [2 points]

If  $g$  is a continuous function, then

$$\int_1^{20} g(x)dx = \int_1^{-100} g(x)dx + \int_{-100}^{20} g(x)dx.$$

True

False

c. [2 points]

If  $h$  is an odd function and is continuous everywhere, then  $h$  is invertible.

True

False

d. [2 points]

If  $k$  is a differentiable function and is always concave up,

then  $k'(a) \leq \frac{k(b) - k(a)}{b - a}$  whenever  $a < b$ .

True

False

e. [2 points]

If  $\ell$  is a continuous function, then

$$\int_2^3 \ell(t)dt \leq \int_2^4 \ell(t)dt.$$

True

False

f. [2 points]

Suppose  $m$  is a twice differentiable function. If  $m''(5) = 0$ ,  
then  $m$  does not have an inflection point at  $x = 5$ .

True

False