

8. [8 points] For each of the following, determine whether the statement is always, sometimes, or never true. Indicate your answer by circling the one word that correctly fills the answer blank. No justification is necessary. No credit will be awarded for unclear markings.

- a. [2 points] If the average value of the force  $F(x)$  on the interval  $3 \leq x \leq 8$  is 12 N then the work done in moving a particle from  $x = 3$  to  $x = 8$  is \_\_\_\_\_ 60 J.

Always

Sometimes

Never

- b. [2 points] Let  $k(x)$  be an even function and let  $K(x)$  be an antiderivative of  $k(x)$ . Then  $K(x)$  is \_\_\_\_\_ an odd function.

Always

Sometimes

Never

- c. [2 points] Let  $h(x)$  be a differentiable function and define  $H(x) = \int_0^x h(t) dt$ . If  $H(x)$  is always concave up, then  $h(e^{-x})$  is \_\_\_\_\_ an increasing function.

Always

Sometimes

Never

- d. [2 points] Suppose a metal rod of density  $\delta(x)$  lying along the  $x$ -axis from  $x = -3$  to  $x = 3$  has its center of mass at  $x = 0$ . Then the two halves of the rod on either side of  $x = 0$  \_\_\_\_\_ have the same mass.

Always

Sometimes

Never