5. Which of the following functions below satisfy the hypothesis of the MVT?

I. $f(x) = \dfrac{1}{x+1}$ on [0, 2]

II. $f(x) = x^{\frac{1}{3}}$ on [0,1]

III. $f(x) = |x|$ on [−1,1]

(A) I only (B) I and II only (C) I and III only (D) III only (E) none of them (F) all of them

6. A toy car travels on a straight path. During the time interval $0 \le t \le 60$ seconds, the toy car's velocity v, measured in feet per second, is a continuous function. Selected values are given below.

t (sec)	0	15	25	30	35	50	60
v(t) (ft/sec)	−10	−15	−10	−7	−5	0	13

For 0 <t<60 , must there be a time t when v(t) $= -2$? Justify.

2. If the average value of the function f on the interval [a b,] is 10, then $\displaystyle\int_a^b f(x)dx$

A) $\dfrac{10}{b-a}$ B) $\dfrac{f(a)+f(b)}{10}$ C) $10b-10a$ D) $\dfrac{b-a}{10}$ E) $\dfrac{f(b)+f(a)}{20}$

6. If x t( ) represents the position of a particle along the x-axis at any time, t, then the following statements are true. (a) "Initially" means when _____ = 0 .

(b) "At the origin" means _____ = 0 .

(c) "At rest" means _____ = 0 .

(d) If the velocity of the particle is positive, then the particle is moving to the _____.

(e) If the velocity of the particle is _____, then the particle is moving to the left.

(f) To find average velocity over a time interval, divide the change in _____ by the change in time.

(g) _____ velocity is the velocity at a single moment (instant) in time.

(h) If the acceleration of the particle is positive, then the _____ is increasing.

(i) If the acceleration of the particle is _____, then the velocity is decreasing.

(j) In order for a particle to change directions, the _____ must change signs.

(k) One way to determine _____ _____ _____ over a time interval, when given the position function or graph, is to find the sum of the absolute values of the differences in position between all resting points

11. Fill in the blanks.

(a) If velocity is negative and acceleration is positive, then speed is _____.

(b) If velocity is positive and speed is decreasing, then acceleration is _____.

(c) If velocity is positive and decreasing, then speed is _____.

(d) If speed is increasing and acceleration is negative, then velocity is _____.

(e) If velocity is negative and increasing, then speed is _____.

(f) If the particle is moving to the left and speed is decreasing, then acceleration is

_____

15. It took Mr. Wenzel from noon until 7 pm to drive from NB to his in-laws' house North of Dallas 385 miles away. After t hours of driving, his distance from NB was given in miles by $s(t) = \dfrac{165}{7}t^2 - \dfrac{110}{49}t^3$

(i) What was his average speed for the trip to his in-laws'?

(A) 53 mph (B) 54 mph (C) 55 mph (D) 56 mph (E) 57 mph (F) 58 mph

(ii) (calculator OK) Mr. Wenzel's instantaneous speed twice coincided with his average speed. At what time did it first happen? (A) 1:33 pm (B) 1:28 pm (C) 5:41 pm (D) 5:31 pm (E) 1:38 pm