

## CALCULUS I - Worksheet #56

1. A particle moves along the x-axis so that its velocity at time  $t$ ,  $0 \leq t \leq 5$ , is given by  $v(t) = 3(t - 1)(t - 3)$ . At time  $t = 2$ , the position of the particle is  $x(2) = 0$ .
- Find the minimum acceleration of the particle.
  - Find the total distance traveled by the particle.
  - Find the average velocity of the particle over the interval  $0 \leq t \leq 5$ .

2.  $\lim_{x \rightarrow \infty} \frac{3x^2 - 4}{2 - 7x - x^2}$  is      A) 3    B) 1    C) -3    D)  $\infty$     E) 0

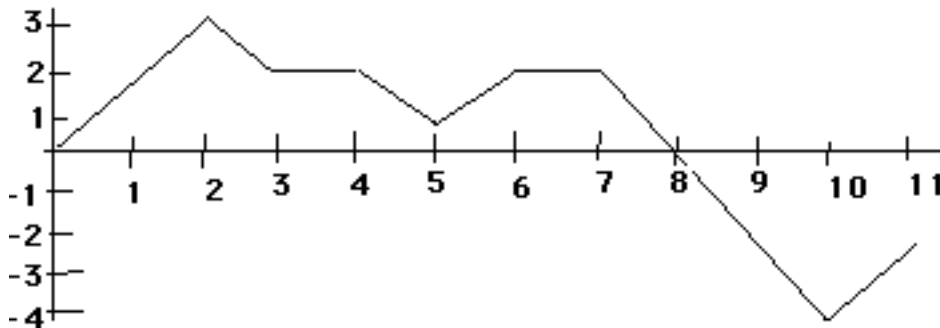
3. Let  $F(x) = \int_0^x \frac{10}{1 + e^t} dt$ . Which of the following statements are true?
- I.  $F'(0) = 5$       II.  $F(2) < F(6)$       III.  $F$  is concave upward
- A) I only    B) II only    C) III only    D) I and II    E) I and III

4.  $\lim_{h \rightarrow 0} \frac{\cos\left(\frac{\pi}{2} + h\right)}{h}$  is    A) 1    B) nonexistent    C) 0    D) -1    E) none of these

5. If  $f(x) = 10^x$  and  $10^{1.04} \cong 10.96$ , which is closest to  $f'(1)$  ?  
**(This is NOT a calculator problem!!)**  
A) 0.24    B) 0.92    C) 0.96    D) 10.5    E) 24

6. If  $f(x) = \cos x \sin 3x$ , then  $f'\left(\frac{\pi}{6}\right)$  is equal to    A)  $\frac{1}{2}$     B)  $-\frac{\sqrt{3}}{2}$     C) 0    D) 1    E)  $-\frac{1}{2}$

Questions 7 and 8 refer to the following graph and information.



A bug is crawling along a straight wire. The velocity,  $v(t)$ , of the bug at time  $t$ ,  $0 \leq t \leq 11$ , is given in the graph above.

- According to the graph, at what time  $t$  does the bug change direction?  
A) 2    B) 5    C) 6    D) 8    E) 10
- According to the graph, at what time  $t$  is the speed of the bug greatest?  
A) 2    B) 5    C) 6    D) 8    E) 10