Name: ______________________________ Mark: _______ / 16

Mini-math Div 3/4: Friday, November 22, 2024 (8.1-8.6) - 15 minutes

1. (2 points) The graph of the piecewise linear function f is shown in the figure to the right. What is the average value of f over $[-3, 5]$?

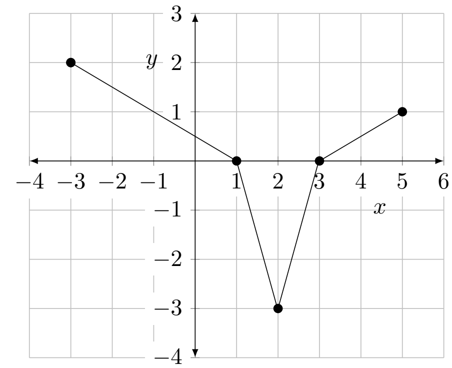
   A. -1

   B. $-1/8$

   C. 0

   D. $1/4$

   E. 2



2. (2 points) The graph of the velocity of a function is the piecewise linear function shown in the figure to the right. The initial position of the particle at time $t = 0$ is $x = 1$. What is the total distance the particle travels from $t = 0$ to $t = 6$?

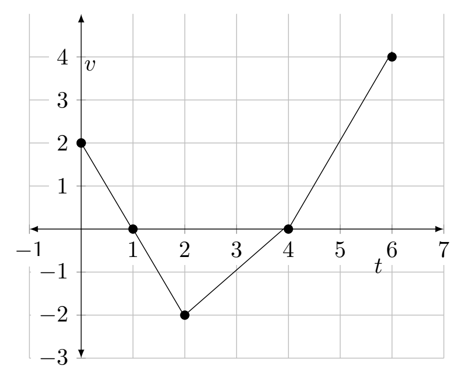
   A. 2

   B. 3

   C. 4

   D. 8

   E. 9



3. (2 points) The acceleration of a particle is modelled by $a(t) = 2t + 3$ for $t \geq 0$. At $t = 0$, the velocity of the particle is -2 and its position is 2.5. What is the change in displacement of the particle from $t = 0$ to $t = 3$?

A. 9 B. 16 C. 16.5 D. 19 E. 22.5

4. (2 points) Suppose f is a differentiable function. Which of the following statements are true:

(I) The average value of the derivative of f over $[a, b]$ is the same as the average rate of change of f over $[a, b]$.

(II) There exists a $c \in [a, b]$ for which $f(c)$ equals the average value of f over $[a, b]$.

A. (I) only B. (II) only C. Both (I) and (II) D. Neither (I) nor (II)

E. The truth of both statements depend on the specific choice of f

5. (2 points) Water is leaking out of a tub at a rate modelled by $r(t) = \dfrac{1}{t^2+1}\text{cm}^3/\text{min}$, where t is in minutes. If the initial volume of the tub is 160 000 cm^3, which of the following represents the volume of the tub at time t?

   A. $160000 + \displaystyle\int_0^t r(x)\,dx$

   B. $160000 - \displaystyle\int_0^t r(x)\,dx$

   C. $160000 - \dfrac{1}{t^2+1}$

   D. $160000 + \dfrac{r(t)}{t^2+1}$

   E. $\dfrac{1}{t^2+1}$

6. (2 points) Find the area of the bounded region in the first quadrant below both $y = x^2$ and $y = 2 - x$ and above the x-axis.

   A. 2/3 B. 5/6 C. 1 D. 7/6 E. 3

7. (4 points) Write an integral (or integrals) to calculate the area of the finite region(s) bounded by the given curves.

$$x + y = 1, \quad 2x - y = -1, \quad 4x - y = 4$$