

 You may use a calculator with these problems.

1. **Multiple Choice** Which of the following values is the average rate of $f(x) = \sqrt{x+1}$ over the interval $(0, 3)$?

- (A) -3 (B) -1 (C) $-1/3$ (D) $1/3$ (E) 3

2. **Multiple Choice** Which of the following statements is false for the function

$$f(x) = \begin{cases} \frac{3}{4}x, & 0 \leq x < 4 \\ 2, & x = 4 \\ -x + 7, & 4 < x \leq 6 \\ 1, & 6 < x < 8 \end{cases}$$

- (A) $\lim_{x \rightarrow 4} f(x)$ exists (B) $f(4)$ exists
 (C) $\lim_{x \rightarrow 6} f(x)$ exists (D) $\lim_{x \rightarrow 8^-} f(x)$ exists
 (E) f is continuous at $x = 4$

3. **Multiple Choice** Which of the following is an equation of the tangent line to $f(x) = 9 - x^2$ at $x = 2$?

- (A) $y = \frac{1}{4}x + \frac{9}{2}$ (B) $y = -4x + 13$
 (C) $y = -4x - 3$ (D) $y = 4x - 3$
 (E) $y = 4x + 13$

4. **Free Response** Let $f(x) = 2x - x^2$.

- (a) Find $f(3)$. (b) Find $f(3 + h)$.
 (c) Find $\frac{f(3 + h) - f(3)}{h}$.
 (d) Find the instantaneous rate of change of f at $x = 3$.