


Put answers on a separate piece of paper. Label each Section. Show all work for Free Response questions.

Quick Quiz for AP* Preparation: Sections 2.1 and 2.2

 You should solve the following problems without using a graphing calculator.

1. **Multiple Choice** Find $\lim_{x \rightarrow 3} \frac{x^2 - x - 6}{x - 3}$, if it exists.

- (A) -1 (B) 1 (C) 2 (D) 5 (E) does not exist

2. **Multiple Choice** Find $\lim_{x \rightarrow 2^+} f(x)$, if it exists, where

$$f(x) = \begin{cases} 3x + 1, & x < 2 \\ \frac{5}{x + 1}, & x \geq 2 \end{cases}$$

- (A) 5/3 (B) 13/3 (C) 7 (D) ∞ (E) does not exist

3. **Multiple Choice** Which of the following lines is a horizontal asymptote for

$$f(x) = \frac{3x^3 - x^2 + x - 7}{2x^3 + 4x - 5}$$

- (A) $y = \frac{3}{2}x$ (B) $y = 0$ (C) $y = 2/3$ (D) $y = 7/5$ (E) $y = 3/2$

4. **Free Response** Let $f(x) = \frac{\cos x}{x}$.

- (a) Find the domain and range of f .
(b) Is f even, odd, or neither? Justify your answer.
(c) Find $\lim_{x \rightarrow \infty} f(x)$.
(d) Use the Sandwich Theorem to justify your answer to part (c).

Quick Quiz for AP* Preparation: Sections 2.3 and 2.4

 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 for 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 $x = 3$.

Ch 2 Review Section

AP* Examination Preparation

 You should solve the following problems without using a graphing calculation.

53. **Free Response** Let $f(x) = \frac{x}{|x^2 - 9|}$.

- (a) Find the domain of f .
- (b) Write an equation for each vertical asymptote of the graph of f .
- (c) Write an equation for each horizontal asymptote of the graph of f .
- (d) Is f odd, even, or neither? Justify your answer.
- (e) Find all values of x for which f is discontinuous and classify each discontinuity as removable or nonremovable.

54. **Free Response** Let $f(x) = \begin{cases} x^2 - a^2x & \text{if } x < 2, \\ 4 - 2x^2 & \text{if } x \geq 2. \end{cases}$

- (a) Find $\lim_{x \rightarrow 2^-} f(x)$.
- (b) Find $\lim_{x \rightarrow 2^+} f(x)$.
- (c) Find all values of a that make f continuous at 2. Justify your answer.

55. **Free Response** Let $f(x) = \frac{x^3 - 2x^2 + 1}{x^2 + 3}$.

- (a) Find all zeros of f .
- (b) Find a right end behavior model $g(x)$ for f .
- (c) Determine $\lim_{x \rightarrow \infty} f(x)$ and $\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)}$.