


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

Quick Quiz for AP* Preparation: Sections 3.1–3.3

 You may use a graphing calculator to solve the following problems.

1. **Multiple Choice** Let $f(x) = |x + 1|$. Which of the following statements about f are true?

- I. f is continuous at $x = -1$.
- II. f is differentiable at $x = -1$.
- III. f has a corner at $x = -1$.

- (A) I only (B) II only (C) III only
(D) I and III only (E) I and II only

2. **Multiple Choice** If the line normal to the graph of f at the point $(1, 2)$ passes through the point $(-1, 1)$, then which of the following gives the value of $f'(1) = ?$

- (A) -2 (B) 2 (C) $-1/2$ (D) $1/2$ (E) 3


3. **Multiple Choice** Find dy/dx if $y = \frac{4x - 3}{2x + 1}$.

(A) $\frac{10}{(4x - 3)^2}$ (B) $-\frac{10}{(4x - 3)^2}$ (C) $\frac{10}{(2x + 1)^2}$
(D) $-\frac{10}{(2x + 1)^2}$ (E) 2

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

- (a) Find all the points where f has horizontal tangents.
- (b) Find an equation of the tangent line at $x = 1$.
- (c) Find an equation of the normal line at $x = 1$.

Quick Quiz for AP* Preparation: Sections 3.4–3.6

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

1. **Multiple Choice** Which of the following gives dy/dx for $y = \sin^4(3x)$?

- (A) $4 \sin^3(3x) \cos(3x)$ (B) $12 \sin^3(3x) \cos(3x)$
(C) $12 \sin(3x) \cos(3x)$ (D) $12 \sin^3(3x)$
(E) $-12 \sin^3(3x) \cos(3x)$

2. **Multiple Choice** Which of the following gives y'' for $y = \cos x + \tan x$?

- (A) $-\cos x + 2 \sec^2 x \tan x$ (B) $\cos x + 2 \sec^2 x \tan x$
(C) $-\sin x + \sec^2 x$ (D) $-\cos x + \sec^2 x \tan x$
(E) $\cos x + \sec^2 x \tan x$


3. **Multiple Choice** Which of the following gives dy/dx for the parametric curve $x = 3 \sin t$, $y = 2 \cos t$?

- (A) $-\frac{3}{2} \cot t$ (B) $\frac{3}{2} \cot t$ (C) $-\frac{2}{3} \tan t$ (D) $\frac{2}{3} \tan t$ (E) $\tan t$

4. **Free Response** A particle moves along a line so that its position at any time $t \geq 0$ is given by $s(t) = -t^2 + t + 2$, where s is measured in meters and t is measured in seconds.

- (a) What is the initial position of the particle?
- (b) Find the velocity of the particle at any time t .
- (c) When is the particle moving to the right?
- (d) Find the acceleration of the particle at any time t .
- (e) Find the speed of the particle at the moment when $s(t) = 0$.

Quick Quiz for AP* Preparation: Sections 3.7–3.9

 You may use a graphing calculator to solve the following problems.

1. **Multiple Choice** Which of the following gives dy/dx at $x = 1$ if $x^3 + 2xy = 9$?

- (A) $11/2$ (B) $5/2$ (C) $3/2$ (D) $-5/2$ (E) $-11/2$

2. **Multiple Choice** Which of the following gives dy/dx if $y = \cos^3(3x - 2)$?

- (A) $-9 \cos^2(3x - 2) \sin(3x - 2)$
(B) $-3 \cos^2(3x - 2) \sin(3x - 2)$
(C) $9 \cos^2(3x - 2) \sin(3x - 2)$
(D) $-9 \cos^2(3x - 2)$
(E) $-3 \cos^2(3x - 2)$

3. **Multiple Choice** Which of the following gives dy/dx if $y = \sin^{-1}(2x)$?

- (A) $-\frac{2}{\sqrt{1-4x^2}}$ (B) $-\frac{1}{\sqrt{1-4x^2}}$ (C) $\frac{2}{\sqrt{1-4x^2}}$
(D) $\frac{1}{\sqrt{1-4x^2}}$ (E) $\frac{2x}{1+4x^2}$

4. **Free Response** A curve in the xy -plane is defined by $xy^2 - x^3y = 6$.

- (a) Find dy/dx .
- (b) Find an equation for the tangent line at each point on the curve with x -coordinate 1.
- (c) Find the x -coordinate of each point on the curve where the tangent line is vertical.

Ch. 3 Review Section

AP* Examination Preparation



You may use a graphing calculator to solve the following problems.

81. A particle moves along the x -axis so that at any time $t \geq 0$ its position is given by $x(t) = t^3 - 12t + 5$.
- (a) Find the velocity of the particle at any time t .
 - (b) Find the acceleration of the particle at any time t .
 - (c) Find all values of t for which the particle is at rest.
 - (d) Find the speed of the particle when its acceleration is zero.
 - (e) Is the particle moving toward the origin or away from the origin when $t = 3$? Justify your answer.
82. Let $y = \frac{e^x + e^{-x}}{2}$.
- (a) Find $\frac{dy}{dx}$.
 - (b) Find $\frac{d^2y}{dx^2}$.
 - (c) Find an equation of the line tangent to the curve at $x = 1$.
 - (d) Find an equation of the line normal to the curve at $x = 1$.
 - (e) Find any points where the tangent line is horizontal.
83. Let $f(x) = \ln(1 - x^2)$.
- (a) State the domain of f .
 - (b) Find $f'(x)$.
 - (c) State the domain of f' .
 - (d) Prove that $f''(x) < 0$ for all x in the domain of f .