

Name: _____

AP Calculus - Multiple Choice Practice

- 1) If $y = \frac{1-x}{2x+1}$, then $\frac{dy}{dx} =$
- A) $\frac{-3}{8x+4}$ B) $\frac{3}{(2x+1)^2}$ C) $-\frac{4x+1}{2x+1)^2}$ D) $\frac{-3}{(2x+1)^2}$ E) $-\frac{1}{2}$
- 2) If $f(x) = \frac{x^2-7}{7-x^2}$, then $\frac{dy}{dx} =$
- A) 1 B) $\frac{14}{(7-x^2)^2}$ C) $\frac{-14}{(7-x^2)^2}$ D) -1 E) 0
- 3) If $f(x) = 3x^{\frac{1}{3}} - 2x^{\frac{1}{2}} + x^{-1}$, then $f'(x) =$
- A) $x^{-\frac{2}{3}} - x^{-\frac{1}{2}} - 1$ B) $x^{-\frac{2}{3}} - x^{-\frac{1}{2}} - \frac{1}{x^2}$ C) $x^{-\frac{1}{3}} - x^{-\frac{1}{2}} - x$
- D) $x^{-\frac{2}{3}} - x^{-\frac{1}{2}} - x$ E) $x^{-\frac{2}{3}} - x^{-\frac{3}{2}} - x$
- 4) If $y = x^2\sqrt{x}$, then $\frac{dy}{dx} =$
- A) $2\sqrt{x}$ B) $\frac{3}{2}x\sqrt{x}$ C) $x\sqrt{x}$ D) $2x\sqrt{x}$ E) $\frac{5}{2}x\sqrt{x}$

Questions 5 and 6 refer to the following:

Differentiate the given function.

- 5) $h(x) = (3 - 2x + x^3)(x^4 + 7)$
- 6) $y = \frac{1}{t^2} - \frac{1}{\sqrt[3]{t}}$
- 7) If $f(x) = \csc x \tan x$, then $f'(x) =$
- A) $\sec x \tan x$ B) $-\frac{1}{\sin x}$ C) $-\sec x \tan x$
- D) $\frac{1}{\sin^2 x \cos x}$ E) $-\csc x \cot x$
- 8) If $f(x) = 3x$, then $f'(-2)$ is
- A) -6 B) 3 C) 6 D) -3 E) 0

- 9) If $f(x) = -\frac{1}{x^3} + \frac{2}{x^2} - \frac{1}{x}$, then $f'(-1) =$
 A) 8 B) 6 C) 2 D) 1 E) 0
- 10) If $f(x) = -2x^{\frac{2}{3}}$, then $f'(8) =$
 A) $\frac{2}{3}$ B) $-\frac{8}{3}$ C) $-\frac{1}{3}$ D) $-\frac{2}{3}$ E) $\frac{1}{3}$
- 11) If $f(x) = \sin x + \cos x$, then $f''(x) =$
 A) $\sin x - \cos x$ B) $2 \sin x \cos x$ C) $-(\cos x + \sin x)$
 D) $\sin x + \cos x$ E) $\cos x - \sin x$
- 12) If $y = \tan x$, then $\frac{d^2y}{dx^2}$ at $x = \frac{\pi}{4}$ is
 A) 4 B) $2\sqrt{2}$ C) $4\sqrt{2}$ D) 2 E) $\sqrt{2}$
- 13) If $y = x \cos x$, then $\frac{d^2y}{dx^2}$ when $x = \frac{\pi}{2}$ is
 A) 0 B) 2 C) -2 D) π E) $-\pi$
- 14) Suppose functions f and g are differentiable functions, where $f(-3) = 2$, $f'(-3) = 6$, $g(-3) = 3$, and $g'(-3) = 4$.
 If $H(x) = \frac{x + g(x)}{f(x)}$, then $H'(-3) =$
 A) 0 B) $-\frac{1}{2}$ C) $\frac{3}{2}$ D) 1 E) $\frac{5}{2}$
- 15) An equation of the line tangent to the graph of $f(x) = \frac{x-1}{2x+1}$ at the point $(-1,2)$ is
 A) $3x + y = -1$ B) $x + y = 1$ C) $3x - y = 1$
 D) $3x - y = -5$ E) $x + 2y = 3$
- 16) An equation of the line tangent to the graph of $y = \sec x - \tan x$ at the point $(0,1)$ is
 A) $y = x + 1$ B) $y = -x$ C) $y = -x + 1$
 D) $y = 1$ E) $y = -2x + 1$
- 17) What is the y -intercept of the line tangent to the graph of the function $f(x) = x^2 + \frac{1}{x}$ at $x = 2$?
 A) $\frac{15}{4}$ B) 3 C) $-\frac{15}{4}$ D) -3 E) $\frac{9}{2}$
- 18) At what point on the graph of $f(x) = 2x - \frac{1}{x}$ is the tangent line parallel to the line $2y - 12x = 7$?
 A) $(2, \frac{7}{2})$ B) $(-\frac{1}{2}, 2)$ C) $(1, 1)$ D) $(-\frac{7}{2}, -2)$ E) $(\frac{1}{2}, -1)$

- 19) The $\lim_{h \rightarrow 0} \frac{(x+h)^5 - x^5}{h}$ at the point $x = 2$ is
- A) 0 B) 80 C) 16 D) 32 E) 10
- 20) What is the instantaneous rate of change of $f(x) = \frac{2x}{x^2 + 1}$ at $x = -1$?
- A) $\frac{1}{2}$ B) 1 C) -1 D) $-\frac{1}{2}$ E) 0