

Name: _____
AP Calculus Practice

* Unless noted with a "*" a calculator is **NOT ALLOWED**.

- 1) What is the x-coordinate of the point of inflection on the graph $y = \frac{1}{3}x^3 + 5x^2 + 24$?
- A. 5 B. 0 C. $-\frac{10}{3}$ D. -5 E. -10
- 2) A particle moves along the x-axis so that its position at time t is given by:
 $x(t) = t^2 - 6t + 5$. For what value of t is the velocity of the particle zero?
- A. 1 B. 2 C. 3 D. 4 E. 5
- 3) If $f''(x) = x(x+1)(x-2)^2$ then the graph of f has inflection points when $x =$
- A. -1 only B. 2 only C. -1 and 0 only D. -1 and 2 only E. -1, 0, and 2 only
- 4) The function f is given by $f(x) = x^4 + x^2 - 2$. On which of the following intervals is f increasing?
- A. $\left(-\frac{1}{\sqrt{2}}, \infty\right)$ B. $\left(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ C. $(0, \infty)$ D. $(-\infty, 0)$ E. $\left(-\infty, -\frac{1}{\sqrt{2}}\right)$
- 5)* The first derivative of the function f is given by $f'(x) = \frac{\cos^2 x}{x} - \frac{1}{5}$.
How many critical values does f have on the open interval $(0, 10)$?
- A. One B. Three C. Four D. Five E. Seven

- 6) Let f be the function with derivative given by $f'(x) = x^2 - \frac{2}{x}$.
On which of the following intervals is f decreasing?
- A. $(-\infty, -1)$ only B. $(-\infty, 0)$ C. $(-1, 0)$ only D. $(0, \sqrt[3]{2})$ E. $(\sqrt[3]{2}, 0)$

- 7) Let f be the function given by $f(x) = 2xe^x$. The graph of f is concave down when
- A. $x < -2$ B. $x > -2$ C. $x < -1$ D. $x > -1$ E. $x < 0$

x	-4	-3	-2	-1	0	1	2	3	4
$g'(x)$	2	3	0	-3	-2	-1	0	3	2

- 8) The derivative g' of a function g is continuous and has exactly two zeros. Selected values of g' are given in the table above. If the domain of g is the set of all real number, then g is decreasing on which of the following intervals?
- A. $-2 \leq x \leq 2$ only B. $-1 \leq x \leq 1$ only C. $x \geq -2$ D. $x \geq 2$ only E. $x \leq -2$ or $x \geq 2$
- 9) Let g be a twice-differentiable function with $g'(x) > 0$ and $g''(x) > 0$ for all real numbers x , such that $g(4) = 12$ and $g(5) = 18$. Of the following, which is a possible value for $g(6)$?
- A. 15 B. 18 C. 21 D. 24
E. 27
- 10)* A particle moves along the x-axis so that at any time $t \geq 0$, its velocity is given by $v(t) = 3 + 4.1 \cos(0.9t)$. What is the acceleration of the particle at time $t = 4$?
- A. -2.016 B. -0.677 C. 1.633 D. 1.814 E. 2.978
- 11)* Let f be the function with derivative given by $f'(x) = \sin(x^2 + 1)$.
How many relative extrema does f have on the interval $2 < x < 4$?
- A. One B. Two C. Three D. Four E. Five

12)* The function f has first derivative given by $f'(x) = \frac{\sqrt{x}}{1+x+x^3}$. What is the x-coordinate of the inflection point of the graph of f ?

- A. 1.008 B. 0.473 C. 0 D. -0.278 E. the graph has no inflection point

13) For all x in the closed interval $[2, 5]$, the function f has a positive first derivative and a negative second derivative. Which of the following could be a table of values for f ?

A.

x	$f(x)$
2	7
3	9
4	12
5	16

B.

x	$f(x)$
2	7
3	11
4	14
5	16

C.

x	$f(x)$
2	16
3	12
4	9
5	7

D.

x	$f(x)$
2	16
3	14
4	11
5	7

E.

x	$f(x)$
2	16
3	13
4	10
5	7