

Name: _____

AP Calc BC

Fall Final Review

Multiple Choice:

1. If $f(x) = x + \sin x$, then $f'(x) =$

- a. $1 + \cos x$
- b. $1 - \cos x$
- c. $\cos x$
- d. $\sin x - \cos x$
- e. $\sin x + \cos x$

2. If F and f are continuous functions such that $F'(x) = f(x)$ for all x , then $\int_a^b f(x)dx =$

- a. $F'(x) - F'(b)$
- b. $F'(b) - F'(a)$
- c. $F(a) - F(b)$
- d. $F(b) - F(a)$
- e. None of the above

3. Let $y = x^2 \cos x$. Then $dy/dx =$

- a. $2x \sin x$
- b. $2x \cos x + x \sin x$
- c. $2x \cos x - x^2 \sin x$
- d. $2x \cos x + x^2 \sin x$
- e. $2x \cos x - x \sin x$

4. If $y = \frac{\sin x}{\cos x}$ then $dy/dx =$

- a. $\sec^2 x$
- b. $\frac{\cos x}{\sin x}$
- c. $\frac{\cos x}{-\sin x}$
- d. $\cot x$
- e. $\sec x$

5. If $f(x) = \frac{1}{3}x^3 - 4x^2 + 12x - 5$ and the domain is the set of all x such that $0 \leq x \leq 9$, then the absolute minimum values of the function occurs when x is

- a. 0
- b. 2
- c. 4
- d. 6
- e. 9

6. A polynomial $p(x)$ has a relative maximum at $(-2, 4)$, a relative minimum at $(5, 7)$ and no other critical points. How many zeroes does $p(x)$ have?

- a. 1
- b. 2
- c. 3

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- d. 4
e. 5
7. If $\int_1^{10} f(x)dx = 4$ and $\int_{10}^3 f(x)dx = 7$, then $\int_1^3 f(x)dx =$
- a. -3
b. 0
c. 3
d. 10
e. 11
8. If $x + 7y = 29$, is an equation of the line normal to the graph of $f(x)$ at the point $(1,4)$, then $f'(x) =$
- a. 7
b. $\frac{1}{2}$
c. $-\frac{1}{7}$
d. $-\frac{7}{29}$
e. -7
9. If $y^2 - 2xy = 16$ then dy/dx
- a. $\frac{x}{y-x}$
b. $\frac{y}{x-y}$
c. $\frac{y}{y-x}$
d. $\frac{y}{2y-x}$
e. $\frac{2y}{x-y}$
10. A particle moves along the x-axis so that at any time $t \geq 0$ its position is given by $x(t) = 48t - 3t^2$. What is the average velocity of the particle between $t=0$ and $t=2$?
- a. 84
b. 42
c. 36
d. 24
e. 18
11. A polynomial $p(x)$ has a local maxima at $(-2,4)$ and $(5,7)$ and a local minium at $(1,1)$ and not other critical points. How many roots does $p(x)$ have?
- a. 1
b. 2
c. 3
d. 4
e. 5

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12. A particle moves along the x-axis so that its position is given by $x(t) = t^3 - 3t^2 - 9t + 1$. For what values of t is the particle at rest?
- None
 - 1 only
 - 3 only
 - 5 only
 - 1 and 3
13. The function defined by $f(x) = x^3 - 3x^2$ for all real numbers x has a relative minimum at $x =$
- 2
 - 0
 - 1
 - 2
 - 4
14. The absolute maximum value of $f(x) = x^3 - 3x^2 + 12$ on the closed interval of $[-2, 4]$ occurs when $x =$
- 4
 - 2
 - 1
 - 0
 - 2
15. Find the value of c on the interval $[0, 4]$ which satisfies the Mean Value Theorem for $y = \sqrt{x}$
- 2
 - 1
 - 2
 - $\frac{1}{2}$
 - None
16. The slope of the tangent line to the curve $xy^3 + y^2x^2 = 6$ at $(2, 1)$ is
- $\frac{3}{2}$
 - 1
 - $-\frac{5}{14}$
 - $-\frac{3}{14}$
 - 0
17. Let f and g be functions that are differentiable everywhere. If g is the inverse function of f and $g(-2) = 5$ and $f'(5) = \frac{1}{2}$, then $g'(-2)$ is
- 2
 - $\frac{1}{2}$
 - $\frac{1}{5}$
 - $-\frac{1}{5}$
 - 2
18. If $x^2 - 3xy + y^2 = -1$ then at $(1, 1)$, $dy/dx =$
- 1
 - 2

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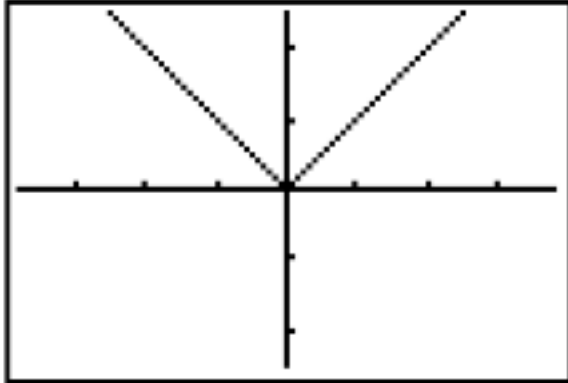
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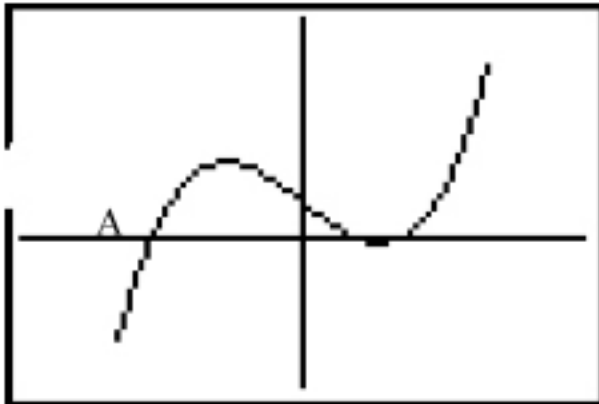
- c. -1
- d. 2
- e. nonexistent

Free Response:

1. Sketch the graph of a function with a jump at $x = 2$.
2. Sketch the graph of a function where 3 is the limit as x approaches 2 but $f(x)$ is undefined.
3. Sketch the graph of the derivative of the function



4. The graph of $f(x)$ is shown. Mark the intervals where $\frac{dy}{dx} > 0$ and $\frac{d^2y}{dx^2} < 0$.



5. How many points of inflection does Figure 2 have?

