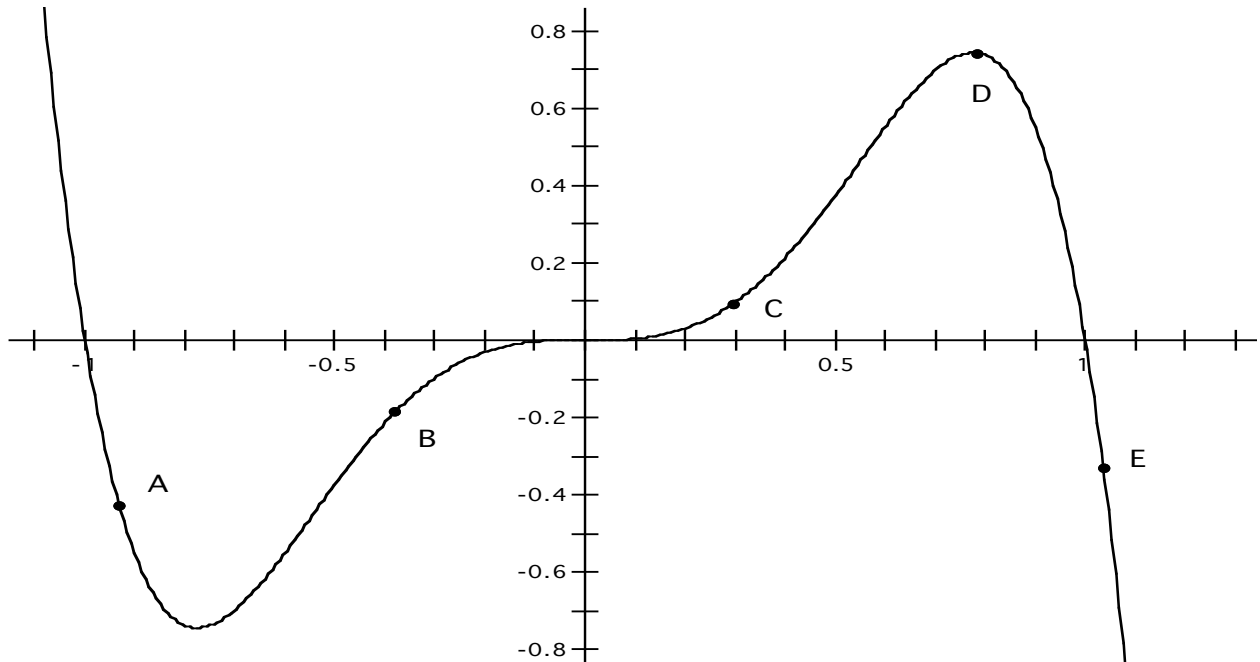


Honors PreCalculus '16-17
Advanced Curve Sketching

Name: _____

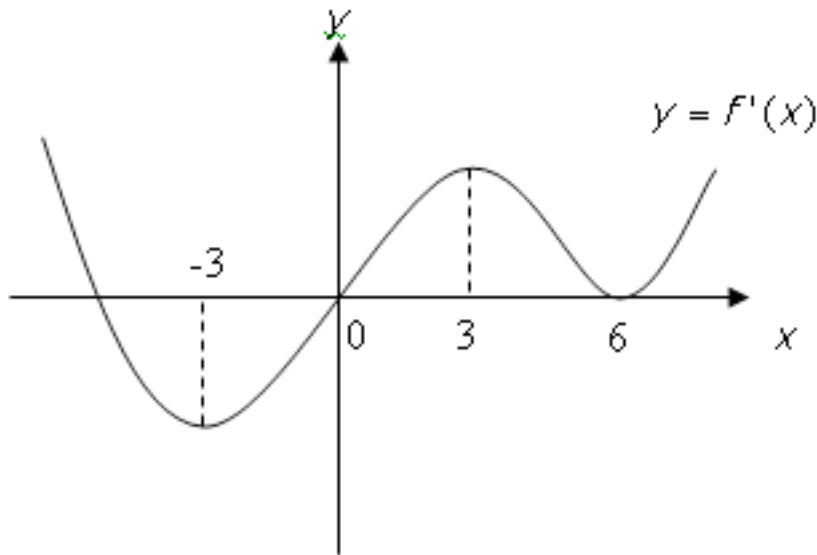
score _____



1. The graph of the function $f(x)$ is shown above. At which point on the graph of $f(x)$ is $f'(x) > 0$ and $f''(x) > 0$?

- (a) A (b) B (c) C (d) D (e) E

2. The graph of the derivative of f is shown below. Which of the following must be true?



- a) f has a local maximum at $x = 0$.
- b) f is increasing on $[-3, 3]$.
- c) f has a point of inflection at $x = 6$.
- d) f is concave down on $[0, 6]$.
- e) f has a local minimum at $x = -3$.

3. Given this sign pattern $F''(x)$ $\leftarrow \begin{array}{cccccc} - & 0 & + & 0 & - & 0 & - \\ & -1 & & 0 & & 2 & \end{array} \rightarrow$ and that $f'(-1) = f'(1) = f'(2) = 0$, which of the following statements must be true?

- I. $F(x)$ has a local maximum at $x = 1$
- II. $F(x)$ has a local minimum at $x = -1$
- III. $F(x)$ has a point of inflection at $x = 2$

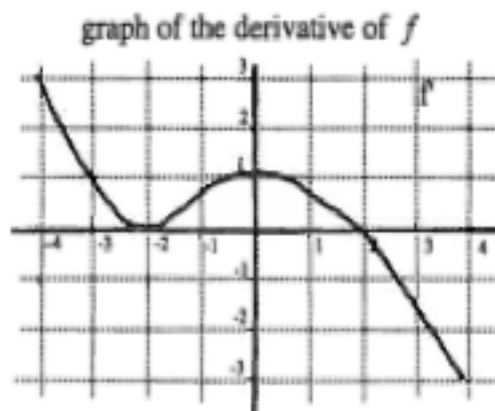
- (a) I only
- (b) II only
- (c) III only
- (d) I and III only
- (e) I, II, and III

4. If $f''(x) = x^2(x+1)^2(x-2)$, then the graph of $f(x)$ 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

5. The graph of the *derivative* of $f(x)$ is shown below. Which of the following is true about the function $f(x)$?

- I. $f(x)$ is decreasing at $x = 0$
- II. $f(x)$ has a local minimum at $x = -2$
- III. $f(x)$ is concave up at $x = -1$



- (a) I only
- (b) II only
- (c) III only
- (d) II and III only
- (e) I, II, and III

6. If $f(x) = 7\sin^2(2x)$, then $f''\left(\frac{\pi}{12}\right) =$

- (a) 0
- (b) 14
- (c) $14\sqrt{2}$
- (d) 28
- (e) $14\sqrt{3}$

Extra Credit

7. $\int(10x+8x^5) dx =$

a) $5x^2 + \frac{4}{3}x^6 + C$ b) $5x^2 + \frac{8}{5}x^5 + C$ c) $10x + \frac{4}{3}x^6 + C$

d) $5x^2 + 8x^6 + C$ e) $5x^2 + \frac{8}{7}x^6 + C$

8. The acceleration function (in m/s^2) and the initial velocity are given for a particle moving along a line. Find the velocity at time t and the distance traveled during the given time interval.

$a(t) = t + 4, v(0) = 3$

a) $v(t) = t^2 + 4t + 3$ b) $v(t) = \frac{t^2}{2} + 4t + 3$ c) $v(t) = \frac{t^2}{2} + 3$

d) $v(t) = t^2 + 4t$ e) $v(t) = \frac{t^2}{2} + 4t$

9. $\int x^2\sqrt{x^3+4} dx$

a. $\frac{2}{3}(x^3+4)^{3/2} + c$ b. $\frac{4}{9}(x^3+4)^{3/2} + c$ c. $\frac{2}{9}x^3(x^3+4)^{3/2} + c$

d. $\frac{1}{3\sqrt{x^3+4}} + c$ e. $\frac{2}{3\sqrt{x^3+4}} + c$

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Round to 3 decimal places.
Show all work.

Name: _____

score _____

1. Given $y = \frac{8x}{x^2 + 4}$, find the sign pattern for $\frac{dy}{dx}$ and determine if the critical values are at a maximum, minimum, or neither.

2. Given $y = \frac{8x}{x^2 + 4}$, find the sign pattern for $\frac{d^2y}{dx^2}$ and name the points of Inflection.

3. Find the domain, zeros and VAs of $y = \ln(-x^4 + 37x^2 - 36)$.

4. Find the extreme points and end behavior of $y = \ln(-x^4 + 37x^2 - 36)$.

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Advanced Curve Sketching

NO CALCULATOR ALLOWED

Show all work.

Name: _____

5. Set up a Key Trait table and sketch $y = \frac{8x}{x^2 + 4}$

6. Show the Algebraic Traits and sketch $y = \ln(-x^4 + 37x^2 - 36)$.

Domain:

Range:

Y – Int:

VAs:

Zeros:

Extreme Points:

End Behavior (Left):

POEs:

End Behavior (Right):

