Tajima HS Solis AP CALC BC

UNIT 2: Application of Derivatives REVIEW QUIZ

Name Exemplar PER______ DATE___________

4.0	5.0	9.0	12.0

Computation

4	3	2	1
Response has no recall errors, *minimal* procedural errors* and no conceptual errors**	**Response has no recall errors, minimal procedural errors and *minimal* conceptual errors**	**Response has no recall errors, but has several procedural errors OR several conceptual errors**	**Recall errors exist OR Steps taken are not related to problem OR Response left blank**

Written Responses

4	3	2	1
Response is written in a complete sentence and uses appropriate academic vocab	**Response is written in a complete sentence, and minimal errors exist in use of academic vocab**	**Response is not written in a complete sentence OR no academic vocab**	**Concept of response is not related to problem OR Response is left blank**

***Procedural errors** are mistakes made in the math
****Conceptual errors** are mistakes made in the steps one take

1. (4.0)

What is the slope of the line tangent to the graph of $y = \ln(2x)$ at the point where $x = 4$

(A) $\frac{1}{8}$ (B) $\frac{1}{4}$ (C) $\frac{1}{2}$ (D) $\frac{3}{4}$ (E) 4

$y' = \frac{1}{2x} \cdot 2 = \frac{1}{x}$

$y'(4) = \frac{1}{4}$

2. (5.0)

If $f(x) = \sqrt{x^2 - 4}$ and $g(x) = 3x - 2$, then the derivative of $f(g(x))$ at $x = 3$ is

(A) $\frac{7}{\sqrt{5}}$ (B) $\frac{14}{\sqrt{5}}$ (C) $\frac{18}{\sqrt{5}}$ (D) $\frac{15}{\sqrt{21}}$ (E) $\frac{30}{\sqrt{21}}$

$f(g(x)) = \sqrt{(3x-2)^2 - 4}$

$f(g(x)) = \sqrt{9x^2 - 12x + \cancel{4} \cancel{-4}}$

$f(g(x)) = \sqrt{9x^2 - 12x}$

$f'(g(x)) = \frac{1}{2}(9x^2 - 12x)^{-\frac{1}{2}} \cdot (18x - 12)$

$f'(g(x)) = \frac{18x - 12}{2(9x^2 - 12x)^{1/2}}$

$f'(g(x)) = \frac{\cancel{2}(9x - 6)}{\cancel{2}(9x^2 - 12x)^{1/2}}$

$f'(g(x)) = \frac{9x - 6}{(9x^2 - 12x)^{1/2}}$

$f'(g(3)) = \frac{9(3) - 6}{\sqrt{9(3)^2 - 12(3)}}$

$= \frac{27 - 6}{\sqrt{81 - 36}}$

$= \frac{21}{\sqrt{45}}$

$= \frac{21}{\sqrt{9}\sqrt{5}}$

$= \frac{21}{3\sqrt{5}}$

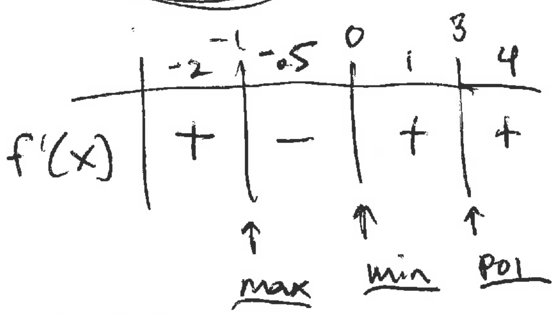
$\frac{7}{\sqrt{5}}$

3. (9.0)

$x=0$ $x=3$ $x=-1$

The function f has a first derivative given by $f'(x) = x(x-3)^2(x+1)$. At what values of x does f have a relative maximum?

(A) -1 only (B) 0 only (C) -1 and 0 only (D) -1 and 3 only (E) -1, 0, and 3

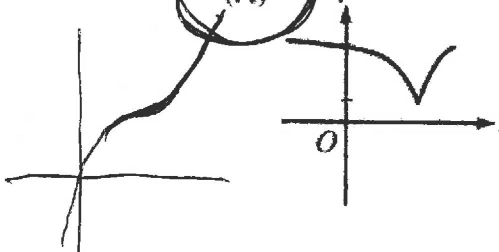


4. (9.0)

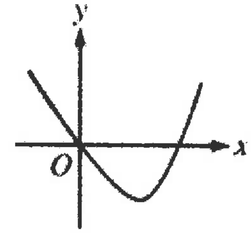
f'(x) is always positive

The function f is differentiable and increasing for all real numbers x, and the graph of f has exactly one point of inflection. Of the following, which could be the graph of f', the derivative of f? **Explain your answer choice in the space provided.**

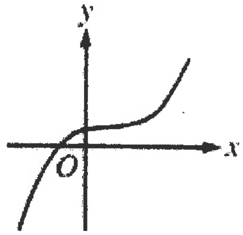
(A)



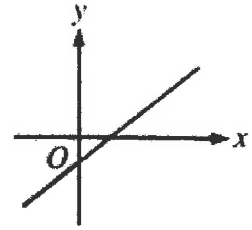
~~(B)~~



~~(C)~~

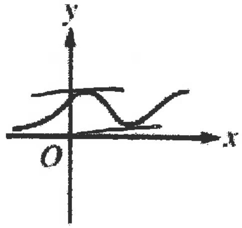


~~(D)~~



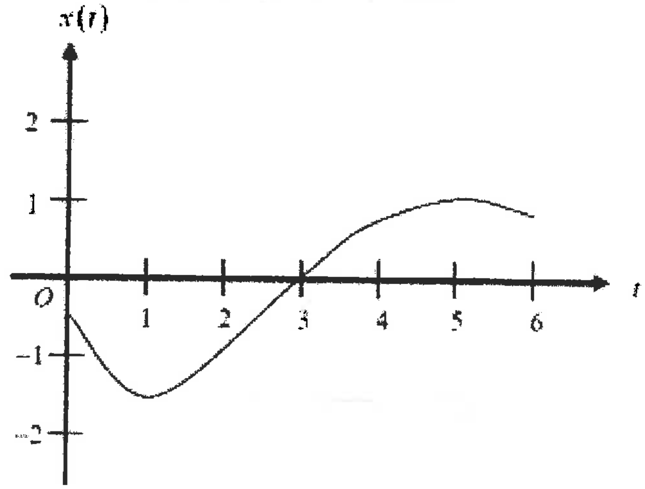
e has too many inflection pts.

(E)



A could be the graph of f' since its always positive and a single point of inflection exists where the derivative of the derivative is equal to 0 or Undef.

5. (12.0) **Explain your answer choice in the space below.**



A particle moves along a straight line. The graph of the particle's position $x(t)$ at time t is shown above for $0 < t < 6$. The graph has horizontal tangents at $t = 1$ and $t = 5$ and a point of inflection at $t = 2$. For what values of t is the velocity of the particle increasing?

(A) $0 < t < 2$

(B) $1 < t < 5$

(C) $2 < t < 6$

(D) $3 < t < 5$ only

(E) $1 < t < 2$ and $5 < t < 6$

~~As~~ to be covered by Thurs. lesson, the velocity is increasing when the sign of the velocity and acceleration is the same. So the particle's velocity is positive and the graph is concave up from 1 to 2. The velocity is negative and the graph is concave down from 5 to 6.