AP Calculus BC Name_____
Derivative Test v9 Per:____

Multiple choice – Circle correct answer. 2 points each.

1. Let f be a differentiable function with $f(2)=3$ and $f'(2)=-5$, and let g be a function defined by $g(x)=xf(x)$. Which of the following is an equation of the line tangent to the graph of g at the point where $x=2$?

a) $y=3x$

b) $y-3=-5(x-2)$

c) $y-6=-5(x-2)$

d) $y-6=-7(x-2)$

e) $y-6=-10(x-2)$

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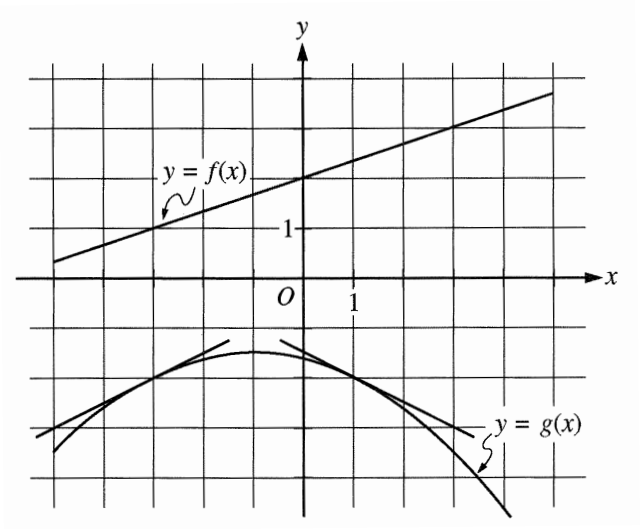
2. The figure below shows the graph of the functions f and g. The graphs of the lines tangent to the graph of g at $x=-3$ and $x=1$ are also shown. If $B(x)=g(f(x))$, what is $B'(-3)$?



a) $-\frac{1}{2}$

b) $-\frac{1}{6}$

c) $\frac{1}{6}$

d) $\frac{1}{3}$

e) $\frac{1}{2}$

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3. Which of the following statements must be true?

I. $\frac{d}{dx}\left(x\csc^{-1}x\right)=\csc^{-1}x-\frac{1}{\sqrt{x^2-1}}$

II. $\frac{d}{dx}\left(\frac{3-2x}{3x+2}\right)=\frac{-13}{(3x+2)^2}$

III. $\frac{d}{dx}\ln(1-x)=\frac{1}{1-x}$

a) I only b) II only c) II and III only

d) I and II only e) I and III

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4. Let $y = f(x)$ be the solution to the differential equation $\frac{dy}{dx} = y + xy$ with the initial condition $f(0) = 1$. What is the best approximation for $f(2)$ if Euler's method is used, starting at $x = 0$ with a step size of 1?

a) 0 b) 1 c) 2 d) 6 e) 24

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5. If $\frac{d}{dx}[f(x)] = g(x)$ and $\frac{d}{dx}[g(x)] = f(3x)$, then $\frac{d^2}{dx^2}[f(x^2)]$ is

a) $4x^2 f(3x^2) + 2g(x^2)$ b) $f(3x^2)$ c) $f(x^4)$

d) $2xf(3x^2) + 2g(x^2)$ e) $2xf(3x^2)$

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6. The slope of the line tangent to the curve $y^2+(xy+1)^3=0$ at $(2,\ -1)$ is

a) $-\frac{3}{2}$ b) $-\frac{3}{4}$ c) 0 d) $\frac{3}{4}$ e) $\frac{3}{2}$

FREE RESPONSE – show all work in a clear, organized manner. Simplify answers.

7. (4pts) $\frac{d}{dx}\left[-8x^7+7x-\frac{4}{3}x^{5/3}-\frac{5}{\sqrt[10]{x^3}}+\frac{1}{17x}\right]$

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8. If $g(x)=\sin^{-1}x^2$, find $g''(x)$

9. If $f(x)=e^{\tan x}$, find $f''(x)$.

10. Given $y^2 + 2x = x^2 + 2xy + 1$.

a) Show that $\frac{dy}{dx} = \frac{x + y - 1}{y - x}$

b) Find the slopes of the tangent lines at all the points where the curve intersects the line $y = 2$.

c) Determine all the points on the curve which had a horizontal tangent line.