Name:_____ Date:_____

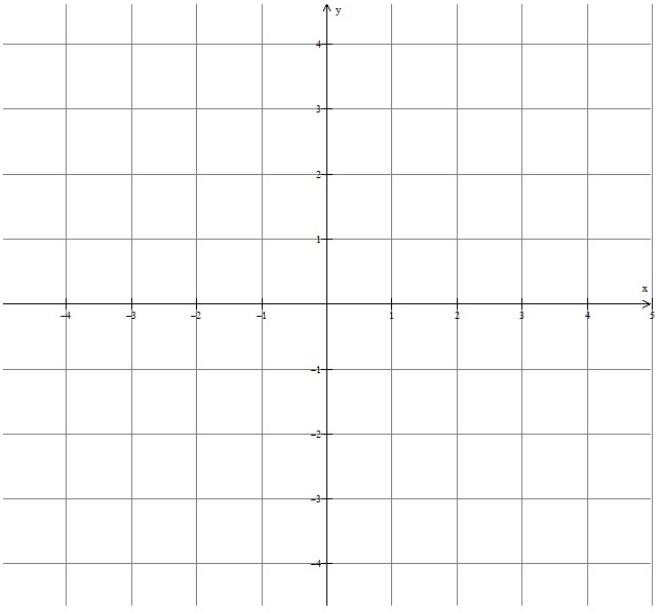
Calculus 12 LG 5-6 Quiz Ver B /30

1. If $f(x) = (x-1)^2$

a) Find the average rate of change from *x* = -1 to *x* = 2. (2 marks)

b) Find the instantaneous rate of change of *y* with respect to *x* at the point *x* = 2. (2 marks)

c) Sketch the graph of $y = f(x)$ together with the secant and tangent lines whose slopes are given by the results of a) and b). (2 marks)



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2. Use the **definition of the derivative** to calculate $f'(x)$ if $f(x) = 3x^2 + 1$ and find the equation of the tangent line to the graph of *f* at *x* = -1.

(3 marks)

3. Show that $f(x) = \begin{cases} \sqrt{-2x+3}, & x \leq 1 \\ 4x - 3, & x > 1 \end{cases}$ is continuous but not differentiable at x = 1.

(3 marks)

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4. Find $\frac{dy}{dx}$ if $y = (2x - 5)(4 - 3x^2 + 2x)$ (2 marks)

5. Find $f''(1)$ if $f(x) = \frac{x+2}{x}$ (2 marks)

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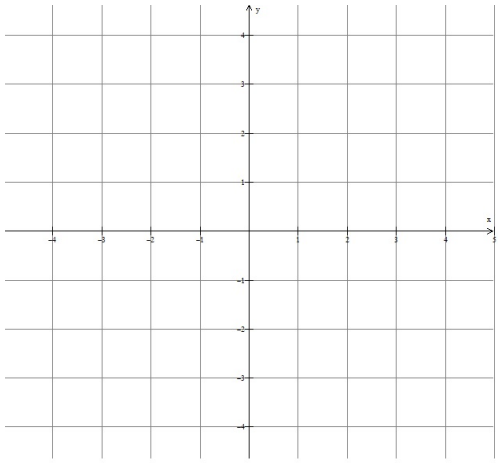
6. Sketch the graph of the derivative of the function whose graph is shown.

(2 marks)



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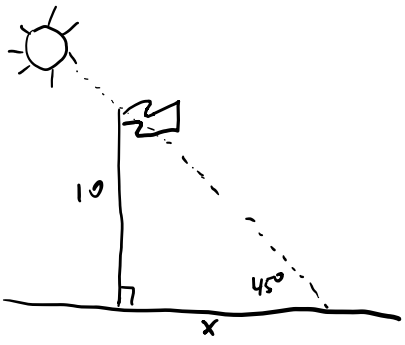
7. The sun is casting a shadow of a 10m tall flag pole on the ground. Find the rate at which the length x of the shadow is changing with respect to θ when θ is 45 degrees. (3 marks)



8. Find $f'(x)$ where $f(x) = (x^2 + 3)secx$ (2 marks)

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9. Find $\frac{dy}{dx}$ where $y = sin^2(2x^3 - x)$ (2 marks)

10. Find the equation of the tangent line to the graph of $f(x) = \cos(x^2 - 9)$ at x = 3. (3 marks)

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11. Use a local linear approximation to estimate the value of 2.02^3.
(2 marks)

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