Chapter 3: Differentiation
Review Assignment

Name: **Date:**

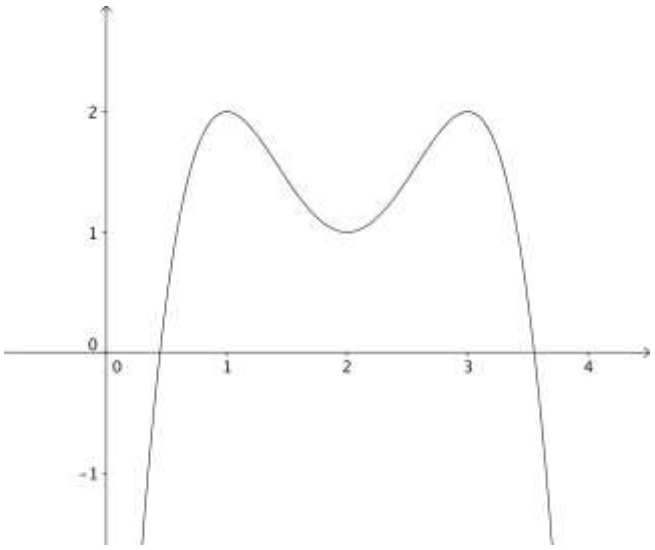
Your Target Grade For This Chapter: (MUST Indicate)
Please CIRCLE One Of: A+ A B C
(This helps the marker give you feedback.)

- **This assignment is to help YOU. It will identify 3 things for you:**
  1. **How much of this chapter you really understand,**
  2. **What you need more practice on before the test,**
  3. **And whether you're doing each step correctly.**
- **Some of the answers are on the last page – what *we* want to see is your *work*. So show *all* necessary work, or you'll see stuff written down *right around here*… ↑ ☺**

This assignment...	
Is Good To Go!	**Needs More Work On Question(s):**

1. Using the definition of the derivative, find $\frac{dy}{dx}$ if $y = \sqrt{x+4}$.

2. Sketch the derivative of the following function on the same graph. ***TIP!** For help with this question you can also check out Ch 8 Lesson 1 (only watch up to the 1:45 mark).



3. Find $f'(x)$:

a) $f(x) = xcosx$

b) $f(x) = \ln(tanx)$

c) $f(x) = \frac{1}{2\pi}\cot^{-1} 3x$

d) $f(x) = \sqrt{x^2 + 3x}$

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4. Find $\frac{dy}{dx}$:

a) $y = \frac{3x^2+9}{2x+3}$

b) $y = 3xe^{\sqrt{x}}$

c) $y = \sec(\tan(x^3))$

d) $y = x^2 \log_3(2-3x)$

5. Find $\left.\frac{d^2y}{dx^2}\right|_{x=4}$ if $y = \frac{2}{x} + 3\sqrt{x}$.

6. If $f(3) = 2$ and $f'(3) = 5$, find the instantaneous rate of change of g(x) with respect to x at x=3, if $g(x) = \frac{f(x)}{x^2}$.

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7. Show algebraically (*not* graphically) that $f(x) = \|x-1\| = \begin{cases} -x+1, & x \le 1 \\ x-1, & x > 1 \end{cases}$ is not differentiable at $x = 1$.	8. Find the equation of the tangent line to the curve $xy^2 + \frac{2}{y} = 4$ at the point (2,1).
9. Find $\frac{dy}{dx}$ if $y = (\ln x)^x$.	10. [**AUDIO question!**] Please answer the following question with a short, 1 minute **(maximum)** audio recording, saved as an "mp3" file, and upload it separately (or give the link to it) in the same hand-in location as this assignment. Using the ideas of *secant lines* and *tangent lines*, explain how the definition of the derivative, $\lim_{h \to 0} \frac{f(a+h)-f(a)}{h}$ gives the instantaneous slope of $f(x)$ at $x = a$.

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(No need to upload this page)

Answers for some of the questions:

(Remember: Show all your work.)

1. Answer should obviously work out to $y' = \frac{1}{2\sqrt{x+4}}$

2. -----

3. a) $cosx - xsinx$ b) $\frac{1}{sinx\ cosx}$ c) $-\frac{3}{2\pi(1+9x^2)}$ d) $\frac{2x+3}{2\sqrt{x^2+3x}}$

4. a) $\frac{6x^2+18x-18}{(2x+3)^2}$ (it won't factor further) b) $3e^{\sqrt{x}} + \frac{3xe^{\sqrt{x}}}{2\sqrt{x}}$

c) $\sec(\tan(x^3))\tan(\tan(x^3))\sec^2(x^3)3x^2$ d) $2x\log_3(2-3x) - \frac{3x^2}{ln3\cdot(2-3x)}$

5. $-\frac{1}{32}$

6. In other words, you're being asked to find $g'(3)$. And the answer will be: $g'(3) = \frac{11}{27}$.

7. Hint: Simply prove that the derivative from each side is different.

8. $y - 1 = -\frac{1}{2}(x-2)$. (Hint: The derivative through implicit diff. works out to be: $y' = -\frac{y^2}{2xy-\frac{2}{y^2}}$).

9. $y' = (\ln x)^x(\ln(\ln x) + \frac{1}{\ln x})$ (Hint: Use logarithmic differentiation.)

10. Need help on recording sound on a Mac?
    - Do an internet search with something like "easy record voice Mac mp3"

    Need help on recording sound on a PC?
    - Do an internet search with something like "easy record voice PC mp3"