TCC / MAC2311-119934 / CALC1 / TEST2 / SUMMER13 / R.6-13-13 //
NAME (LAST,FIRST) _____ , _____

INSTRUCTIONS: (1). Do no more than 3 problems per page. (2) Do all work and box all answers – except for #4 – on the worksheets. (3) Draw a horizontal line segment between each problem. (4) The only writing in the margins is the numbering of the pages. (5) Write your name only on the test paper. (6) Do not write on the back of any page. (7) Turn in all pages, even scrap paper. (8) Good Luck!

1. [8pts] Find an equation of the tangent line to the curve at the given point.

$$y = \sqrt{x} \quad @ \ (4,2)$$

You may use the "Rules of Derivatives" in this problem.

2. [8pts] The limit represents the derivative of some function *f* at some number *a*. State such an *f* and *a*.

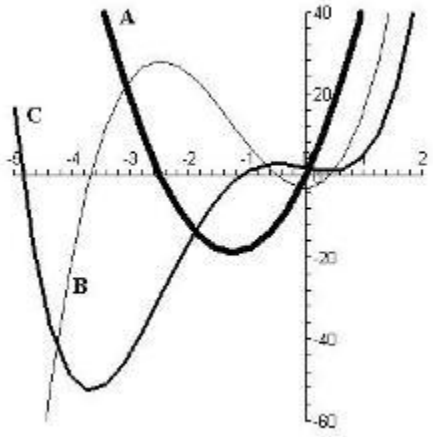
$$\lim_{h \to 0} \frac{\sqrt{4+h} - 2}{h}$$

3. [8pts] The cost (in dollars) of producing *x* units of a certain commodity is

$$C(x) = 10000 + 8x + 0.05x^2$$

Find the instantaneous rate of change of *C* with respect to *x* when *x* = 100. (This is called the *marginal cost*.) – Your answer will be in *dollars per unit*.

4. [8pts] The figure shows the graphs of *f*, *f '*, and *f ''*. Identify each curve. Circle your answer for A, B, and C on this sheet. **NWR**.



A is *f* *f'* *f''*

B is *f* *f'* *f''*

C is *f* *f'* *f''*

5. [8pts] Differentiate the function. $y = \sqrt{x}\left(x-7\right)$. You may use any of the Rules for Derivatives.

6. [8pts] Find the x-coordinates of the points on the curve $y = 3x^4 - 28x^3 + 60x^2$ where the tangent line is horizontal. Show your work. (This is NOT a graphing problem).

7. [9pts] Differentiate. Use any rules that are required. $\dfrac{x^2}{2-x^3}$ Collect like terms, and simplify the numerator in your final answer. Show your work.

8. [9pts] If $g(t) = t\cos t$, find $g'(t)$ and $g''(t)$. Show your work.

9. [9pts] Find y' and y'' if $y = \tan\left(3x\right)$. Show your work.

10. [9pts] Find y' by implicit differentiation, given that $\dfrac{5}{x} + \dfrac{5}{y} = 13$. Show your work.

11. [8pts] Find y' if $y = x\ln\left(x\right) - x$. Show your work.

12. [8pts] If the tangent line to $y = f(x)$ at $\left(5,-1\right)$ passes through the point $\left(-6,3\right)$, find $f(5)$ and $f'(5)$.

Bonus [8pts]. Where does the normal line to the parabola $y = x^2 - x$ at the point $\left(1,0\right)$ intersect the parabola a second time? You may use the Rules of Derivatives, as needed.