MATH 3B WORKSHEET 1

DANNING LU

1. General Guidelines

My name: Danning Lu (he/him)
You are welcome to address me as "Danning", "Mr. Lu" or "TA Lu".
I'm your TA, and I'm in charge of your sections. My goal is to help you throughout your learning process, so do not hesitate to contact me if you have academic questions, or sometimes non-academic ones.
My email: danning.lu@math.ucsb.edu
My office hour: Mondays 2-3 in South Hall 6432G (grad tower, pink side). You can also schedule an appointment with me via email.
You are allowed to use laptops, phones, tablets, etc in sections, but NO CALCULATORS.
You can interrupt me if you have any questions, or if you can not hear me or understand me.
What we do in sections:
We will spend the first few minutes answering questions from lectures. So be sure to make a mark on your notes if you want it to be explained in sections. Then we will spend most of the time doing practising problems. We will have a 4-minute quiz (with only one problem) starting at x:40, and at x:44 you will exchange your quiz with your partner and you will grade each other's quizzes. I'll collect them, have a look and take the attendance information, and return the quiz to you in the next section.
There will always be a lot of problems on the worksheet, which you probably won't have enough time to finish in sections, and some of which may be harder than the midterms or the final. Be sure to make use of them.
Section attendance and quizzes do not contribute directly to your final grades. But you will get at least a D- if you attend lectures and sections, do the homework and sit the final. To get a higher grade, you need to motivate yourself to practice as much as possible.

2. "Area under the curve"

Give an underestimate of the area under the curve
$$y = \sin(x)$$
between $x = 0$ and $x = \frac{\pi}{2}$ by using 3 rectangles.

3. Derivatives

3.1. Derivative Rules.

(1) $(f(x) + g(x))' =$
(2) $(f(x) - g(x))' =$
(3) $(f(x) \cdot g(x))' =$
(4) $\left(\dfrac{f(x)}{g(x)}\right)' =$
(5) $(f(g(x)))' =$
(6) (C is a constant number) $(Cf(x))' =$

3.2. Useful Results.

(1) $(x^{\mu})' =$
(2) $(\sin x)' =$
(3) $(\cos x)' =$
(4) $(e^{x})' =$
(5) $(\ln x)' =$
(6) $(\arcsin x)' =$
(7) $(\arccos x)' =$
(8) $(\arctan x)' =$

3.3. Practice problem sets.

3.3.1. *Set 1.*

(1) $y = (2x + 5)^{4}$

(2) $y = \cos(4 - 3x)$

(3) $y = \sin^2 x \cdot \sin(x^2)$

(4) $y = \ln(1 + x^2)$

(5) $y = e^{(} - 3x^2)$

(6) $y = \tan(x^2)$

3.3.2. *Set 2.*

(1) $y = \arcsin(1 - 2x)$

(2) $y = \dfrac{1}{\sqrt{1 - x^2}}$

(3) $y = e^{-\frac{x}{2}} \cos(3x)$

(4) $y = \dfrac{1 - \ln x}{1 + \ln x}$

(5) $y = \ln(x + \sqrt{a^2 + x^2})$

(6) $y = \dfrac{\sin(2x)}{x}$

3.3.3. *Set 3.*

(1) $y = e^{\arctan \sqrt{x}}$

(2) $y = \dfrac{\arcsin x}{\arccos x}$

(3) $y = \sqrt{x + \sqrt{x}}$

(4) $y = \ln(\ln(\ln(x)))$

(5) $y = \sqrt{1 + \ln^2 x}$

(6) $y = \arcsin \sqrt{\dfrac{1 - x}{1 + x}}$

4. Quizzes

NAME:_____ PERM:_____ SECTION TIME:_____

Differentiate

$$y = \sqrt{\cos(t)\ln(t^4)}.$$