

Math 21B: Calculus II
Fall 2016, Sections B01-B02
Homework Sheet 1
Due: Tuesday, September 27th, 2016

Submit your solutions to the following problems at the beginning of your discussion section on Tuesday, September 27th. You should present your work in a clean and organized fashion, either on a printed copy of this document or a separate sheet of paper. As stated in the syllabus, late submissions will **not** be accepted.

1. Find the derivatives of the following functions.

(a) $f(x) = x \ln(x) - x$

(b) $g(x) = \ln(\sin(x) \cos(x))$

2. Consider the function $f(x) = \cos(x)$.

(a) Approximate the area under $f(x)$ between $x = 0$ and $x = 2\pi$ using a left hand sum with 4 rectangles of equal width.

(b) Do you think your answer to part (a) is an over estimate or an under estimate? Justify your answer using the graph of $f(x)$.

3. Evaluate the following sums.

$$(a) \sum_{k=0}^7 2^k$$

$$(b) \sum_{k=1}^n \left(n^2 + \frac{1}{n} \right)$$

$$(c) \left(\sum_{k=1}^{100} (-1)^k k \right) + \left(\sum_{k=1}^{100} (-1)^{k+1} k \right)$$

Hint: this can be solved without writing hundreds of terms!