

Math 8  
Fall 2019

Preliminary Homework  
Assigned Friday, September 20

Note: Preliminary homework is always graded credit or no credit. **You get full credit for completing the assignment, whether or not your answers are correct, as long as your work shows you have thought about the problem.** The purpose of preliminary homework is to start you thinking about the topic of the next class.

You may use your preliminary homework for in-class activities with your classmates. You should be sure to think about these questions so you will be prepared.

Preliminary homework is always due at the *beginning* of the next class.

We have seen that the Taylor series for the function  $f(x)$  at the point  $a$  is, loosely speaking, the infinite Taylor polynomial,

$$\sum_{k=0}^{\infty} \frac{f^{(k)}(a)}{k!} (x - a)^k.$$

When all goes well, then for those  $x$  for which this series converges, it actually converges to the function  $f(x)$ . In some specific cases (such as  $e^x$ ,  $\sin(x)$ ,  $\cos(x)$ ,  $\ln(x)$ ) we can use Taylor's inequality to show this is true.

1. Write down the Taylor series for  $f(x) = e^x$  centered at the point  $a = 0$ .
2. Write down a new series, whose terms are the derivatives of the terms of the series in part 1. What happens?