

Preliminary Homework  
Assigned Monday, September 16

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.

1. Find the  $n^{\text{th}}$  degree Taylor polynomial  $P_n(x)$  for the function  $f(x) = \frac{1}{1-x}$  centered at the point  $a = 0$ .

Hint: It may be helpful to think of this as  $f(x) = (1 - x)^{-1}$ .

For the remaining problems,  $P_n(x)$  will mean this polynomial, so do your very best to get this part right. Get help at tutorial, if necessary.

2. Find  $P_n(x)$  for the following values of  $n$  and  $x$ .
  - (a)  $x = 1$  and  $n = 0, 1, 2, 3$ .
  - (b)  $x = -1$  and  $n = 0, 1, 2, 3$ .
  - (c)  $x = \frac{1}{2}$  and  $n = 0, 1, 2, 3$ .
3. What does each of the following approach (if anything) as  $n \rightarrow \infty$ ? Why? (We haven't discussed limits of this sort yet, so think intuitively.)
  - (a)  $P_n(1)$ .
  - (b)  $P_n(-1)$ .
  - (c)  $P_n(\frac{1}{2})$ .