

Math 8
Winter 2020

Written Homework Day 2
Assigned Wednesday, January 8

Note: Standard (not preliminary) written homework is graded on your work and your explanations, not just on your answer.

Explanations are important for many reasons. Being able to communicate what you know shows a depth of understanding beyond that of being able to get the right answer to a problem. Doing the mental work of putting explanations into words helps create that depth of understanding. On exams, we will grade your work and not just your answers, so this is good practice for taking exams.

For all these reasons, be sure to: show all your work; explain your reasoning; use clear English; write neatly so all this effort does not go to waste.

Written homework is always due at 10:00 AM on the following Monday.

Homework:

1. Use the *definition* of limit to show that $\lim_{n \rightarrow \infty} \left(\frac{1}{n}\right) = 0$.
2. Use the fact that if $|x| < 1$ then $\lim_{n \rightarrow \infty} x^n = 0$ to show that if $|x| < 1$ then

$$\lim_{n \rightarrow \infty} \frac{1 - x^{n+1}}{1 - x} = \frac{1}{1 - x}.$$

You do not have to use the formal definition of limit. You may use the same arithmetic rules you learned for limits of functions; for example,

$$\text{if } \lim_{n \rightarrow \infty} a_n = A \text{ and } \lim_{n \rightarrow \infty} b_n = B, \text{ then } \lim_{n \rightarrow \infty} (a_n + b_n) = A + B.$$

(Hint: Don't be misled by the fact that x looks like a variable. Changing n does not change x , so $(x)_{n=0}^{\infty}$ is the constant sequence with value x . This means that you know the value of $\lim_{n \rightarrow \infty} x$.)