Practice – 1

Once you feel confident with numerical approximation with limits, complete problem 1. Check your answers by going to the Solutions tab in Moodle.

Instructions: Answer each of the following practice questions on a separate piece of paper. Step by step solutions are provided under the Solutions tab. You will learn the material more thoroughly if you complete the questions before checking the answers.

1. Some limits, like $\lim_{x \to 0}(1+x)^{\frac{1}{x}}$, do not easily lend themselves to algebraic analysis. In such cases, it is helpful to use numerical approximation as follows.

   Let $f(x) = (1+x)^{\frac{1}{x}}$. Calculate values of $f(x)$ as x takes values closer and closer to 0. The table of values, completed below, includes values that approach 0 from the left ($x < 0$) as well as values that approach 0 from the right ($x > 0$). Use the table to approximate the limit.

x	$f(x)$
-0.5	4.000
-0.1	2.867
-0.01	2.732
-0.001	2.720
0.001	2.717
0.01	2.705
0.1	2.594
0.5	2.250