

Extra Credit

Math 195-1XD

April 7, 2019

$$\sqrt{1+1} = 1.41421356\dots$$

$$\sqrt{1+\sqrt{1+1}} = 1.55377397\dots$$

$$\sqrt{1+\sqrt{1+\sqrt{1+1}}} = 1.59805318\dots$$

$$\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+1}}}} = 1.61184775\dots$$

$$\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+1}}}}} = 1.61612120\dots$$

If we continue adding more and more radicals in this way to the expression on the left, the computations on the right get closer and closer to a particular number, called the *limit*.

Question: What is the limit?

$$\sqrt{1+\sqrt{1+\sqrt{1+\dots}}}=?$$

And why? You must show all steps of your solution in order to receive any credit. This assignment is worth up to 5 extra quiz points.

Hint:

$$\text{If } f(x) = x$$

$$\text{then } f(f(x)) = f(x) = x,$$

and so on.