

Math 580: Quiz 1

Show ALL Work

Name _____

1. We showed in class that $\sqrt{2}$ is irrational, and you can use that $\sqrt{2}$ is irrational in this problem without proving it. It is not known whether π^e is irrational, and it is not known whether $\pi + e$ is irrational. Using complete English sentences, prove that at least one of the numbers

$$\pi^e, \quad \pi + e, \quad \text{and} \quad \sqrt{2}(\pi^e + \sqrt{2}(\pi + e))$$

is irrational. (Hint: Make an appropriate assumption, and note that I am not saying that you need to determine which of these three numbers is irrational.)