

**MATH 150A-QUIZ 2, WINTER 2019**

Name: \_\_\_\_\_

1 (5 pts). Show that  $\lim \left(1 + \frac{1}{2n}\right)^n = \sqrt{e}$ .

2 (5 pts). Define a sequence by

$$b_1 = \sqrt{2}, \quad b_2 = \sqrt{2 + \sqrt{2}},$$

and, in general,

$$b_{n+1} = \sqrt{2 + b_n}.$$

Prove by induction that  $\{b_n\}$  is monotone increasing, bounded, and  $b_n < 2$ . Compute  $\lim b_n$ .