

Understanding the Irrational Number e

1. Recall the formula $A(t) = Pe^{rt}$ for instantaneous compounding. Refer to page 345 #15 for additional details. Use this formula to determine the following values.

a) How much will \$100 be worth invested at 4% per year, after 3 years?

b) How much will \$2000 be worth invested at 3% per year, after 10 years?

c) How long will it take \$300 to reach \$500 invested at 2% per year?

2. On your calculator, graph $y = e^x$. Which two functions in the form $y = c^x, c \in \mathbb{N}$ is it between? What does this imply about the value of e ?

3. Consider the expression

$$\sum_{x=0}^{\infty} \frac{1}{x!}$$

Evaluate this expression for a reasonably large value of x , such as 50...much larger and your calculator may overflow! The sigma operation is in MATH 0:summation. It adds up all of the terms of the series as x goes from 0 to ∞ . Do you recognize this value?

4. See page 382 C3 Mini Lab. Complete Step 1 only. Evaluate the expression $\left(1 + \frac{1}{n}\right)^n$ as $n \rightarrow \infty$.

Conclusion: e is an irrational number (just like π) that is approximately equal to 2.718. We will see more of this number in chapter 8 and also in Calculus.