

QUIZ 2

Name: _____

Question 1. Is the function $f(x) = \cos(x)$, $0 \leq x \leq \pi$ invertible? Why or why not?

Question 2. Suppose you invest \$10 at a yearly interest rate of 5% to be compounded continuously. ($y(t) = y_0 e^{rt}$)

(a) How long will it take for your money to double?

(b) How long will it take for your money to double if you invest \$100 instead?

Question 3. What is your main reason for taking this class?

SOLUTIONS TO QUIZ 1

Solution to Question 1. From the graph of the cosine curve, we see that when the domain is restricted to $[0, \pi]$, the curve passes the **Horizontal Line Test**. Therefore $f(x)$ is one-to-one, which means it is invertible.

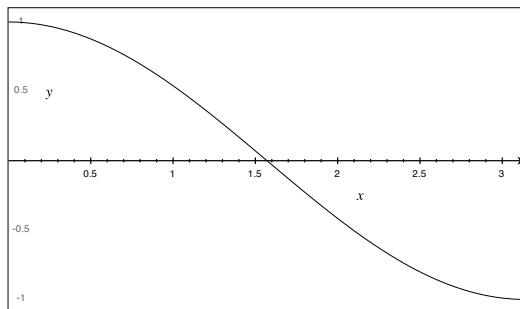


Figure 1: The graph of $y = \cos(x)$, $0 \leq x \leq \pi$.

Solution to Question 2.

- (a) From the formula for exponential growth, we know that after t years the amount of money in the account will be $y(t) = 10e^{0.05t}$ dollars. We want to find a time T such that $y(T) = 20$.

$$\begin{aligned} y(T) &= 20 \\ 10e^{0.05T} &= 20 \\ e^{0.05T} &= 2 \\ \ln(e^{0.05T}) &= \ln 2 \\ 0.05T &= \ln 2 \\ T &= (\ln 2)/(0.05) = 20 \ln 2 \end{aligned}$$

Therefore the money in our account will double in $\boxed{T = 20 \ln 2 \approx 13.86 \text{ years}}$.

- If we had invested \$100 instead of \$10, then the calculation is the same as for part (a), except in the second line the 10 would be replaced with 100 and the 20 with 200. Since $200/100 = 20/10 = 2$, this does not affect the remainder of the calculation, so the answer is still $\boxed{T = 20 \ln 2 \approx 13.86 \text{ years}}$.

Solution to Question 3. The correct answer to this question is

“Because a Magic 8-Ball told me to.”