

Midterm Examination 2 Review

MTH 13 Section E01

Exam Date: 21 March 2017

1. Let T be an equilateral triangle with side length x . Express the area of T as a function in x .

2. Let $f(x) = 2x^2$. Compute

$$\frac{f(x+h) - f(x)}{h}.$$

3. Draw the graph of

$$f(x) = \frac{9}{x^2 + 2}$$

satisfying the following criteria:

- $f(0) = 9/2$, $f(1) = 3$, and $f(2) = 3/2$.
- As x gets bigger, the value of $f(x)$ gets smaller, while having positive values.
- $f(x) = f(-x)$.

Also find the domain and the range of the function f .

4. Consider the unit circle in the xy -plane. Explain why the unit circle is not a graph of a function.

5. Suppose you deposited \$100 to an ETF with 7.68% of APR.

(1) What is the total value of the investment after 40 years?

(2) Plot the graph of function obtained from (1) in the xy -plane. Here x -axis stands for years (N) and the y -axis the total value of the investment when \$100 was deposited initially.

Note that the S&P 500 index recorded 20 years average APY 7.68%. Note also that $(1.0768)^{20} = 4.4$ and $(1.0768)^{40} = 19.3$.

6. Solve for x :

$$\log(2x + 5) + \log 3 = \log(3x + 5)$$

7. Solve for x :

$$3^{2x-2} = 9^{4x+1}$$

8. Simply $\log_{\frac{1}{25}} 125$ so that the final form does not have log in it.

9. Use the properties of logarithm and expand the following expression into a form that only contains sum or difference of log or numbers.

$$\log_7 \frac{x^2 y^{-3}}{\sqrt[3]{49}}$$

10. Draw the graph of $y = (1000)^x$ in the $x(\log y)$ -plane.