

MATH/EECS 1028: DISCRETE MATH FOR ENGINEERS
WINTER 2017
Assignment 1 (Released January 27, 2017)
Submission deadline: 1:25 pm, Feb 6, 2015

Notes:

1. The assignment can be handwritten or typed. It MUST be legible.
2. You must do this assignment individually.
3. Submit this assignment only if you have read and understood the policy on academic honesty on the course web page. If you have questions or concerns, please contact the instructor.
4. Use the dropbox near the EECS main office to submit your assignments. No late submissions will be accepted. Please do not send files by email.
5. Your answers should be precise and concise. Points may be deducted for long, rambling arguments.

Question 1

[4 points] Let A, B be non-empty sets. Prove that $A \times B = B \times A$ if and only if $A = B$.

Question 2

[4 points] Suppose that $f : S \rightarrow T$ is a function. Prove that $f(A \cap B) = f(A) \cap f(B)$ for all subsets A, B of S if and only if f is injective.

Question 3

[3 points] Find a formula for

$$T_n = 1^2 - 2^2 + 3^2 - \dots + (-1)^{n-1}n^2.$$

Hint: This series is neither arithmetic nor geometric.

Question 4

[4 points] Given that $\log_{ab} a = 4$, find $\log_{ab} \frac{\sqrt[3]{a}}{\sqrt{b}}$.

Question 5

[4 points] Prove that $\log_3 7$ is irrational.