

MATH 287 HOMEWORK 5

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Exercise 1. Show some of your favorite equations in *inline* and **display** mathematics.

Answer. Some people like small equations such as $e^{\pi i} + 1 = 0$ or $a^2 + b^2 = c^2$.

My favorite small equation is

Other people like big equations like

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

and

$$\int x^n dx = \frac{1}{n+1} x^{n+1} + C.$$

My favorite big equation is

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Exercise 2. Project 5.16(ii). Prove or give a counterexample: For all sets A, B, C , $A \cap (B - C) = (A \cap B) - (A \cap C)$.

Answer. -enter your answer here-

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Exercise 3. Proposition 5.20(ii).

Exercise 4. Project 5.21(ii).

(Prove or disprove. If you believe the equation is true, give a proof. If you believe it is not true for all sets, give a counterexample. You can try making up some random sets and working out each side of the equation to see if they match or not.)

Exercise 5. Find $\sum_{j=0}^k f_j^2 = (\text{your answer})$, where the are Fibonacci numbers as defined in the textbook. Prove your answer.

Your answer will have a clear statement: (your answer). Then, a proof of your answer.

For your proof, use induction.

For example, since the Fibonacci numbers start with , you will get values starting with 0, 1, 1, 2, 3, 5, 8, ..., you will get values starting with $0^2 = 0$, $0^2 + 1^2 = 1$, $1^2 + 1^2 = 2$, $1^2 + 1^2 + 2^2 = 6$, and so on.

Hint: Work out some of the values and look for a pattern. It might be helpful to look at factorizations of the values.