

**Math 132**  
**Homework 4**  
**due April 16**

**April 2**

Instructions: Do all of the problems fully. Make sure your name is on every sheet which you turn in. You must offer explanations/justifications for your answers in order to receive credit. Feel free to work with others, but you must turn in your own homework.

1. Now that we have finished the probability section of the course, I would like some feedback on it. Feel free to e-mail me, or, if you prefer, use the anonymous feedback form on the website. What did you think went well? What might be a better way to approach some topics? What could I have done differently?
2. Below are two sets of patterns, like those we dealt with in class. Answer the following questions about each set of patterns.

(a) Figure out the perimeter at the fifth stage (assume each edge has length 1).

Answer: for a), the fifth stage has a perimeter of 13. For b), it has 17.

(b) Write out two different formulas for the perimeter at the  $n$ th stage, and describe how each formula reflects the pattern.

Answer: for both parts, there are many equally good answers. For a), lets say  $f(n) = 2n + 3$ , and  $f(n) = 4n - 2(n - 1) - 1 + 2$ . For b), two choices are  $g(n) = 3n + 2$  and  $g(n) = 5n - 2(n - 1)$ .

(c) Show that your two formulas are algebraically equivalent. Justify each step you make with an algebraic rule (associativity, commutativity, distributivity, etc).

Answer: for a), we have that  $4n - 2(n - 1) - 1 + 2 = 4n - 2n + 2 - 1 + 2 = 2n + 3$ , where the first equality follows from the distributive property, and the second equality follows from the associative property. For b), we have  $5n - 2(n - 1) = 5n - 2n + 2 = 3n + 2$ , where the first equality follows from the distributive property, and the second from the associative property.

3. Draw the first and second stage of a pattern of squares such that the pattern can be extended in two different ways (just like the pattern we discussed in class). Describe how your pattern progresses in words. Calculate the recursive formula for each pattern.

Answer: Obviously I can't provide an answer here. I will say that people had some very interesting patterns. Good work!