MATH 636, Fall 2015
Homework 9
To be prepared for presentation on Thursday, October 22.

Background reading: Combinatorics: A Guided Tour, Sections 3.3.

Only consult with your classmates or professor to discuss the problem set.

We will discuss solutions to these questions in class.

Feel free to use *Wolfram Alpha* or *Mathematica* to look at the coefficients of this generating function.

Recall that the Mathematica command to find the coefficients of the generating function from class is: `Series[1/(1-x)/(1-x^2)/(1-x^3),{x,0,98}]`

9-1. Consider the scenarios in parts (b), (d), (e), and (f) of Exercise 3.3.2 on page 113. For each of these **four** scenarios,

(i) Find a concise generating function for the situation.

(ii) Identify the coefficient that you would need to extract to answer the question.

(iii) Actually extract the coefficient [*in parts (d), (e), and (f)*].

9-2. (a) Algebraically verify the equation

$$\frac{1}{(1-x)(1-x^2)(1-x^3)} = \frac{1}{3(1-x^3)} + \frac{1}{4(1-x^2)} + \frac{1}{4(1-x)^2} + \frac{1}{6(1-x)^3}.$$

(b) Use the equation from Part (a) to determine an explicit formula for the number of ways to score n points in a basketball game.

(c) How many ways there are to score 100 points in a basketball game?