

**Math 724, Fall 2013**  
**Homework #4**

**Instructions:** Write up your solutions in LaTeX and hand in a hard copy in class on **Friday, October 18**. Collaboration is allowed (and in fact encouraged), but each student must write up his or her solutions independently and acknowledge all collaborators. If you get help from an external source such as a website, you must write the solution in your own words and provide an explicit citation.

(#1) Problem #128.

(#2) Problem #129.

(#3) Problem #136. For extra credit, calculate the answer by writing a short piece of code in Sage and include your code in your written solutions. (Use the `verbatim` environment to get LaTeX to pay attention to line breaks and indentation.) The [Sage Vignette](#) (click for link) may be helpful.

(#4) Problem #137.

(#5) Problem #142.

(#6) Problem #149.

(#7) Problem #150.

(#8) How many partitions  $\lambda = (\lambda_1, \dots, \lambda_n)$  with  $n$  parts have the property that  $1 \leq \lambda_k \leq n + 1 - k$  for all  $k$ ? (Hint: Write down all such partitions for  $n = 1, 2, 3, 4$ , and you will have a pretty good guess of what the answer is. Then find an appropriate bijection.)