

# Math 574 1992, Final Exam Solutions

PRINT Your Name: \_\_\_\_\_

There are 11 problems on 6 pages. The exam is worth a total of 150 points.

SHOW your work. **CIRCLE** your answers. CHECK your answers.

1. (13 points) How many integer solutions are there to the equality

$$x_1 + x_2 + x_3 + x_4 = 14,$$

with  $1 \leq x_1$ ,  $2 \leq x_2$ ,  $0 \leq x_3$ , and  $0 \leq x_4$ ?

Let  $y_1 = x_1 - 1$ ,  $y_2 = x_2 - 2$ . The original problem is equivalent to

$$y_1 + y_2 + y_3 + y_4 = 11, \quad 0 \leq y_i$$

This is a "bag of candy" problem with 4 flavors 11 pieces; i.e., 3 switches and 11 picks

$$\binom{14}{3}$$

$$\binom{20}{3} = 1140$$

2. (13 points) A class contains 50 women and 20 men. Ten people are chosen at random. What is the probability that none are men?

There are  $\binom{70}{10}$  ways to choose 10 people at random.

There are  $\binom{50}{10}$  ways to choose 10 women.

$$\frac{\binom{50}{10}}{\binom{70}{10}}$$