Math 421 Winter 2017 Midterm 1

NAME: ID#:

- Please write clearly and **show enough work** (this is very important!).
- No electronic devices are allowed.

Question 1. (5 pts) *A single die is rolled four times in a row. How many outcomes will have all four numbers different? You should calculate the numerical value of the answer.*

Question 2. (5 pts) *How many ways are there to put 6 different balls into 4 different boxes with no box left empty? Give your answer in numerical value.*

Question 3. (5 pts) *How many ways are there to put 8 different balls into 3 identical boxes with no box left empty? Give your answer in numerical value.*

Question 4. (5 pts) *How many integer solutions are there to*

$$x_1 + x_2 + x_3 = 11, \qquad 1 \leqslant x_1 \leqslant 10, \; 3 \leqslant x_2 \leqslant 9, \; -1 \leqslant x_3 \leqslant 5? \tag{1}$$

Calculate the numerical value of the answer.

Question 5. (5 pts) *How many different terms are there in the expansion of*

$$(x+y+z)^{10}\,(t+u+v+w)^4\,(p+q+r+s)^3? \tag{2}$$

Calculate the numerical value of your answer.

Question 6. (5 pts) *How many different ways are there to color a regular tetrahedron with three colors?*