

MATH213 HW 5

Due Wednesday, September 27

Solve five of the six problems below.

1. Determine which amount of postage can be formed using just 5-cent and 7-cent stamps. Prove your answer using mathematical induction.

2. How many strings of 10 English letters are there

- (a) that contain x if letters can repeat?
- (b) that contain a if letters cannot repeat?
- (c) that contain at least one vowel if letters cannot repeat?
- (d) that contain exactly one vowel if letters cannot repeat?
- (e) that contain at least two vowels if letters cannot repeat?

Explain how did you get your answers. It might give you partial credits even if the numerical answers are incorrect.

3. How many positive integers between 400 and 1000 inclusive

- (a) are divisible by 11?
- (b) are not divisible by 3?
- (c) are divisible by 6 or 9?
- (d) are divisible by 6 but not by 9?
- (e) have distinct digits?

Explain how did you get your answers. It might give you partial credits even if the numerical answers are incorrect.

4. How many strings of 10 English letters contain the letter x or the letter y at least once if

- (a) letters can repeat? (b) letters cannot repeat?

5. In how many ways can a photographer at a wedding arrange 7 people in a row from a group of 11 people, where the bride and the groom are among these 11 people, if

- (a) the bride must be in the picture?
- (b) both the bride and the groom must be in the picture?
- (c) the bride must be next to the groom?

6. A student has 37 days to prepare for an examination. From past experience she knows that she will require no more than 60 hours of study. She also wishes to study at least one hour per day. Show that no matter how she schedules her study time (a whole number of hours per day, however), there is a succession of days during which she will have studied exactly 13 hours.