

MATH213 HW 8

due **Apr 11** before class.

Solutions without explanation will receive no points.

1: There are 345 students at a college who have taken a course in calculus, 212 who have taken a course in discrete mathematics, and 188 who have taken courses in both calculus and discrete mathematics. How many students have taken a course in either calculus or discrete mathematics?

2: There are 30 video game players. 15 of them play Legend of Zelda, 17 of them play Call of Duty and 20 of them play World of Warcraft. Legend of Zelda and Call of Duty is played by 8 players, Call of Duty and World of Warcraft is played by 10 players and World of Warcraft and Legend of Zelda also by 10 players. How many players play all three games?

3: How many permutations of the 26 letters of the English alphabet do not contain strings *fish*, *rat*, or *bird*?

4: Determine the number of integer solutions of $x_1 + x_2 + x_3 \leq 40$ where $1 \leq x_1, x_2, x_3 \leq 20$.

(If you struggle too much with ≤ 40 , you may solve $= 40$ for partial credits.)

5: Determine the number of permutations of $\{1, 2, \dots, 9\}$ in which at least one odd integer is in its natural position.

6: Determine the number of permutations of the multiset

$$S = \{3 \cdot a, 4 \cdot b, 2 \cdot c\},$$

where, for each type of letter, the letters of the same type do not appear consecutively. (Thus *abbbbcaca* is not allowed but *abbacacb* is.)

7: A carousel has eight seats, each representing a different animal. Eight girls are seated on the carousel facing forward (each girl looks at another girl's back). In how many ways can the girls change seats if that each has a

different girl in from of her. How does the problem change if all the seats are identical?