

## STAT2203/7203: Week 7 Practical Questions

1. Let  $X$  and  $Y$  be continuous random variables with joint pdf

$$f(x, y) = \begin{cases} 6(x - y)^2, & 0 \leq x \leq 1, 0 \leq y \leq 1 \\ 0, & \text{else.} \end{cases}$$

- (a) Find the marginal pdf of  $X$  and the marginal pdf of  $Y$ .
  - (b) Are  $X$  and  $Y$  independent?
  - (c) Find the probability of the event  $\{(X, Y) : X > \frac{1}{2}, Y > \frac{1}{2}\}$ .
2. Based on the student survey data, suppose that pulse rates while completing the survey come from a Normal distribution with mean 71.7 bpm and standard deviation 11.7 bpm.
- (a) What is the probability that a random student has a pulse rate of at least 90 bpm?
  - (b) What is the probability that a random student has pulse rate between 60 and 80 bpm?
  - (c) What value would put a student in the bottom 10% of pulse rates?
  - (d) In a random sample of 5 students, what is the probability that at least 3 of them have a pulse rate over 90 bpm while completing the survey?