

# Math 372 Midterm 1

Wednesday, February 26

Name: \_\_\_\_\_

This is the first midterm. It is worth a total of 100 points.

**No electronic devices are permitted.** Carefully read each question and understand what is being asked before you start to solve the problem. Please show all your work and circle or mark in some way your final answers.

$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$

$$P(A|B) = \frac{P(B|A) \cdot P(A)}{P(B)}$$

- A binomial rv  $X \sim \text{Binom}(n, \alpha)$  has pdf  $f(y) = \binom{n}{y} \alpha^y (1 - \alpha)^{n-y}$ , for  $y = 0, \dots, n$ , and  $f(y) = 0$  otherwise.
- A Poisson rv  $X \sim \text{Pois}(\lambda)$  has pdf  $f(y) = \frac{\lambda^y e^{-\lambda}}{y!}$  for  $y \in \mathbb{N}$  and  $f(y) = 0$  otherwise.
- A continuous uniform rv  $X \sim \text{Unif}(a, b)$  has pdf  $f(y) = \frac{1}{b-a}$  for  $a \leq y \leq b$  and  $f(y) = 0$  otherwise.
- A normal rv  $X \sim \text{Norm}(\mu, \sigma)$  has pdf  $f(y) = \frac{1}{\sqrt{2\pi}\sigma} \exp\left(-\frac{(y-\mu)^2}{2\sigma^2}\right)$ .