midterm 2

Q1 multiple choice
Q2 - Q4 : short answer
] 25 marks.

Ch 5, 6, 7

Ch 5: Normal distribution.

→ finding prob. → 68-95-99.7.
→ Standard Normal table.

→ sum / difference indep. Normal r.v., average.

Ch. 6:

Bernoulli. single coin flip.

$$X = \begin{cases} 1 & \text{success } p \\ 0 & \text{failure } q = 1-p. \end{cases}$$

Binomial

X = # successes in n ind. Ber. trials.

eg. $P(\#\text{ heads} = 14 \text{ in } 20 \text{ tosses})$

Geometric

X = # trials to get 1st success

eg. coin repeatedly tossed 1st time head appears is on 14th trial.

Poisson $\longleftrightarrow$ **Exponential** (continuous)

X = # successes in given time / length / area etc.

T = time / length between successive events.

Ch: 7 : Approximations.

Distribution	Approximate with	Check:	
		$n \geq 20$, $np < 5$	$\lambda t = np$
Binomial	Poisson		$E(X) = np$
	Normal * continuity correction.	$np \geq 5$, $n(1-p) \geq 5$	$Var(X) = np(1-p)$
		$\lambda t \geq 20$	$E(X) = \lambda t$
Poisson	Normal * continuity corr.		$Var(X) = \lambda t$

CLT: $n \geq 20$, $X_1, \ldots, X_n$ indep., random sample.

$\bar{X} \sim N(\mu, \frac{\sigma^2}{n})$ approx.