Bunker Hill Community College
imagine the possibilities

Math 181 2nd Exam Practice A

Spring 2019

Name: ______________________________

- Write your **full name** on the line above.
- Show your work. Incorrect answers with work can receive partial credit.
- Attempt every question; showing you understand the question earns some credit.
- If you run out of room for an answer, continue on the back of the page. Before doing so, write "see back" with a circle around it.
- You can use 1 page (front and back) of notes.
- You can use (and probably need) a calculator.
- You can use the Geogebra Scientific Calculator instead of a calculator. You need to put your phone on **airplane mode** and then within the application, start **exam mode**; you should see a green bar with a timer counting up.
- If a question is confusing or ambiguous, please ask for clarification; however, you will not be told how to answer the question.
- **Box your final answer**.
- A formula sheet is attached to this test.

Do not write in this grade table.

Question:	**Q1**	Total
Points:	10	10
Score:		

Normal Distribution:

$X \sim \mathcal{N}(\mu,\ \sigma)$
$\mu =$ population mean
$\sigma =$ population standard deviation
$x =$ possible value of X
$P =$ percentile of x

$$P = \Phi(x)$$
$$x = \Phi^{-1}(P)$$

Bernoulli Distribution:

$X \sim \texttt{Bern}(p)$
$X =$ 0 for fail or 1 for success
$p =$ probability of success

$$\begin{aligned} P(X=0) &= 1-p \\ P(X=1) &= p \\ \mu &= p \\ \sigma &= \sqrt{p(1-p)} \end{aligned}$$

Geometric Distribution:

$X \sim \texttt{Geo}(p)$
$X =$ number of trials until first success
$p =$ probability of success on each trial
$n =$ a possible number of trials

$$\begin{aligned} P(X=n) &= (1-p)^{n-1}(p) \\ \mu &= \frac{1}{p} \\ \sigma &= \sqrt{\frac{1-p}{p^2}} \end{aligned}$$

Binomial Distribution:

$X \sim \mathcal{B}(n,\ p)$
$X =$ number of successes from n trials
$p =$ probability of success on each trial
$n =$ number of trials
$k =$ a possible number of successes

$$\begin{aligned} P(X=k) &= \binom{n}{k} p^k (1-p)^{n-k} \\ \mu &= np \\ \sigma &= \sqrt{np(1-p)} \end{aligned}$$

If $np \geq 10$ and $n(1-p) \geq 10$, then

$$X \sim \mathcal{N}(\mu,\ \sigma)$$

Continuity correction:

$$P(X \leq k) \ \approx\ \Phi\left(\frac{k+0.5-\mu}{\sigma}\right)$$

$$P(X < k) \ \approx\ \Phi\left(\frac{k-0.5-\mu}{\sigma}\right)$$

Mean-Sampling Distribution:

$\bar{X} =$ sample mean
$s =$ sample standard deviation
$n =$ sample size
$\mu =$ population mean
$\sigma =$ population standard deviation
$SE =$ standard error

$$SE = \frac{\sigma}{\sqrt{n}}$$

If $n \geq 30$ (or if population is normal) then:

$$\bar{X} \sim \mathcal{N}(\mu,\ SE)$$

Confidence Interval:

$CI =$ confidence interval
$\gamma =$ confidence level
$\bar{x} =$ sample mean
$s =$ sample standard deviation

$$z^{\star} = \Phi^{-1}\left(\frac{\gamma+1}{2}\right)$$
$$SE \approx \frac{s}{\sqrt{n}}$$
$$CI = \bar{x} \pm z^{\star} SE$$

Q1. (10 points) Hi