Name: _____
MAT 121
Summer 2019
Homework 8

"Alcohol is very very bad. . . for children. But when you turn 21 it becomes very very good."
– Turanga Leela, Futurama

Problem 1: Explain why, without appealing to algebra or formulas, $\binom{n}{0} = 1$.

Problem 2: Explain why, without appealing to algebra or formulas, $\binom{n}{1} = n$.

Problem 3: Explain why, without appealing to algebra or formulas, $\binom{n}{k} = \binom{n}{n-k}$.

Problem 4: Explain what the Central Limit Theorem says.

Problem 5: Suppose you have a distribution with mean μ and standard deviation σ. How does the sampling distribution for size $n = 100$ compare to the sampling distribution for size $n = 64$?

Problem 6: Suppose the scores for an exam are normally distributed with mean $\mu = 83$ and standard deviation $\sigma = 4$. Let X represent the score on this exam.

(a) What is $P(X \leq 80)$?

(b) What percentage of students scored at most 80% on the exam? What percentage of students scored *less than* 80% on the exam?

(c) What is the minimum score required to be in the top 22% of exam takers?

(d) What is the probability that a student scores at 90% on the exam?

(e) What is the probability that a group of 15 students score an average of at most 80%?

(f) Could you do (e) if the exam scores were not normally distributed?