Name: _____
MATH 100
Fall 2023
HW 15: Due 12/11

"If you torture the data long enough, it will confess."
–Ronald Coase

Problem 1. (10pt) Suppose that the average yearly cost of a private, four-year institution is normally distributed with mean $26,489 and standard deviation $3,204. Fahad is hoping to spend between $18,000 and $32,000 per year on his education. What percentage of private, four-year institutions meet Fahad's criterion?

Problem 2. (10pt) State the Central Limit Theorem. Explain at least two ways in which it is used in Statistics.

Problem 3. (10pt) You have purchased a new 3D printer to create small board game pieces for your small business. The product description states that the variation (measured by the standard deviation) in production time for a project of your size should be no more than 1.2 hours. You create use the machine to create 15 sample pieces and find a mean production time of 241.2 minutes.

(a) Create a 98% confidence interval for the mean production time for your product.

(b) What does your computation in (a) assume? Explain.

Problem 4. (10pt) You and your three friends would like to win a trivia competition to buy paper from your company to meet your quarterly sales targets. To make it to the final rounds, you need to be in the top 10% of teams. This requires team have at least some average number of questions answered correctly. Looking at past data, you see that the average *individual* gets only 64 questions correct with a standard deviation of 7 questions. Assume that the distribution of number of questions answered correctly by individuals is normally distributed.

(a) What is the probability that you and your friends can average at least 70 correctly answered questions?

(b) What is the probability that you and your friends will average less than 65 questions answered correctly?

(c) What is the probability that you and your friends will average between 65 and 70 correctly answered questions?

(d) What is the probability that *you* answer more than 70 questions correctly?