

MAT 345 - Homework 2
Due Wednesday, September 26, 2018, in class

1. We collect the following data about game companies. For each type, decide its level of measurement.
 - (a) Name of company
 - (b) Salary of CEO
 - (c) Number of games produced in the last year
 - (d) Coolness factor: "awesome", "nice", "it's the money"
 - (e) Paint color in the lobby
 - (f) Temperature in the lobby ($^{\circ}\text{F}$)
 - (g) The GPA of the CEO as an undergraduate.
2. The National Education Association Almanac of Higher Education gives the following average distribution of professional time allocation for college professors: teaching 51%; research 16%; professional growth 5%; community service 11%; service to institution 11%; outside consulting 6%.
 - (a) Make a bar graph showing the allocation of time for professors.
 - (b) Make a pie chart showing the allocation of time for professors (your chart should be to scale).
3. Decline of the Arctic Sea ice: the attached file includes data describing the size of the sea ice in the Arctic Ocean in the month of September, starting with 1979 (Data from Journal of Statistics Education, Volume 21, Number 1 (2013)). September is the month when the ice stops melting each summer and reaches its minimum extent.
 - (a) Draw a scatter plot of the data.
 - (b) Draw a histogram of the data, using 7 classes. Make sure to include a table with the classes and frequencies for each class.
 - (c) Create a stem and leaf display of the data.
 - (d) Find the mode, median and mean of the data.

4. Let A and B be events with $P(A) = 0.4$
 - (a) If A and B are disjoint events and $P(A \cup B) = .64$, compute $P(B)$.
 - (b) If $P(A \cap B) = .06$ and $P(A \cup B) = .64$, compute $P(B)$.
 - (c) If A and B are independent events and $P(A \cup B) = .64$, compute $P(B)$.
5. Each digit in my string is equally likely to be 0 or 1. Consider the events A ="the string has at most one 1" and B ="the string has both 0s and 1s." Are A and B independent if
 - (a) the string has length 3
 - (b) the string has length 4?
6. A class of size 20 meets in a room with 5 left-handed and 18 right-handed seats. If each student has a $1/5$ probability of being left-handed, find the probability that each student will have a seat to match their needs.
7. An urn contains 8 red, 7 blue and 5 green balls.
 - (a) A friend draws out two balls and tells you they are different colors. Knowing this, what is the probability the balls were one red and one blue?
 - (b) A friend draws out two balls and tells you at least one is red. Knowing this, what is the probability the other ball is green?
8. You are going to meet a friend at the airport. Your experience tells you that the plane is late 70% of the time when it rains, but it is late only 20% of the time when it does not rain. The weather forecast calls for a 40% chance of rain. What is the probability the plane will be late?
9. Two girls have identical piggy banks. The older girl has 18 quarters and 12 dimes; the younger girl has 2 quarters and 8 dimes. One day, the two banks get mixed up. You pick up a bank at random and shake it until a coin comes out. What is the probability you get a quarter? Note that there are 20 dimes and 20 quarters.
10. Consider the following data on traffic accidents during a year:

age group	% of drivers	accident probability
16 – 25	15	.10
26 – 45	35	.04
46 – 65	35	.06
over 65	15	.08

- (a) Calculate the probability a randomly chosen driver will have an accident this year
- (b) Calculate the probability a driver is between 46 and 65, given that they had an accident.