Homework #11 - due Friday, April 23rd, 2021

1. An experiment measuring the percent shrinkage on drying of 50 clay specimens produced the following data:

18.2	21.2	23.1	18.5	15.6
20.8	19.4	15.4	21.2	13.4
16.4	18.7	18.2	19.6	14.3
16.6	24.0	17.6	17.8	20.2
17.4	23.6	17.5	20.3	16.6
19.3	18.5	19.3	21.2	13.9
20.5	19.0	17.6	22.3	18.4
21.2	20.4	21.4	20.3	20.1
19.6	20.6	14.8	19.7	20.5
18.0	20.8	15.8	23.1	17.0

- (a) Compute the sample mean, median, and mode.
- (b) Compute the sample variance.
- (c) Group the data into class intervals of size 1 percent starting with the value 13.0; and draw the resulting histogram.
- (d) For the grouped data acting as if each of the data points in an interval was actually located at the midpoint of that interval, compute the sample mean and sample variance and compare this with the results obtained in parts (a) and (b). Why do they differ?
- 2. Use the table to find the sample correlation coefficients between salaries in
 - (a) government and universities (tenure-track at four-year institution)
 - (b) private firms (private noneducational) and universities (tenure-track at four-year institution).

				Tenure-track		
		Private		at four-year		Other
Ph.D field	Total	noneducational	Government	institution	$\mathbf{Postdoc}$	educational
Total	48,400	68,000	55,000	43,400	30,000	33,000
Computer sciences	$75,\!000$	82,000	66,000	53,000		60,000
Engineering	66,700	70,000	65,000	56,300	38,000	55,000
Life sciences	$35,\!000$	61,000	48,000	42,500	28,000	36,000
Math sciences	$45,\!000$	60,500	55,200	39,500	40,000	38,000
Social sciences	$45,\!000$	53,000	52,400	40,000	30,500	35,000
Physical sciences	$52,\!000$	64,000	58,000	39,400	32,700	39,000

Median salaries for recent U.S. doctorate recipients (1-3 years after degree), by sector of employment: 1999

- = Fewer than 50 cases.

Source: National Science Foundation Division of Science Resources Statistics (NSD/SRS). Survey of Doctorate Recipients, 1999.

- 3. A gambler in Las Vegas is drawing a card from a standard deck. What is the probability that the card for the gambler will be the following? (A deck has 52 cards, 4 suits and 13 numbers).
 - (a) A face card
 - (b) A queen
 - (c) A spade
 - (d) A jack of spades
- 4. A manufacturing company has 10 machines in continuous operation during a workday. The probability that an individual machine will break down during the day is .10. Determine the probability that during any given day three machines will break down.
- 5. An automobile manufacturer has discovered that 20% of all the transmissions it installed in a particular style of truck 1 year are defective. It has contacted the owners of these vehicles and asked them to return their trucks to the dealer to check the transmission. The Friendly Auto Mart sold seven of these trucks and has two of the new transmissions in stock. What is the probability that the auto dealer will need to order more new transmissions?