MAT 105 - Homework 1

Due Tuesday, January 19, 2016, in class

1. Complete the following table: input your info and decide the measurement level for each of the data types.

Your data	Level of measurement
Name	
Year of birth	
Height	
Color of your hair	
Last 4 digits of your phone number	
Letter grade on last math test	
Distance from home to DP	
Time it takes you get to school	
Favorite game	

2. 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 (°F)

   (g) The GPA of the CEO as an undergraduate.

3. 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).

4. Make a time plot of the **high** temperature in Seattle from January 1, 2016 to January 12, 2016. You can find this data on www.accuweather.com (under month).

   You may use a spreadsheet software program on the rest of this homework (Problems 5-10).

5. For the data in problem 4, find the mode, median, mean, range and variance.

6. How many people attend NFL games? The first table in the attached data file gives the average attendance per game in each of the seasons from 1970 to 2012 (data from www.nfl.com/history).

   (a) Express the data in thousands of people, by rounding to the nearest thousand. For example, 65,123 is represented by 65 (thousands) while 59,723 is represented by 60 (thousands).

(b) Draw a time plot of the data from (a).

(c) Draw a histogram of the data from (a), using 6 classes. Make sure to include a table with the classes and frequencies for each class.

(d) Create a stem and leaf display of the data from (a)

7. Using the same data as in Problem 6 (a), find the mode, median and mean.

8. Decline of the Arctic Sea ice: the second table in the attached data file describes 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.

9. Using the same data as in Problem 8, find the mode, median and mean.

10. Before the renovation in 1985 of the Lincoln County Courthouse, New Mexico, made famous by Billy the Kid, the Museum of New Mexico commissioned for a thorough analysis of the area. The distribution of artifacts (from 1880s) for seven excavation sites were:

| 851 | 596 | 444 | 956 | 576 | 219 | 326 |

(data source: Museum of New Mexico: Laboratory of Anthropology Notes No. 357)

(a) Compute the range

(b) Compute the mean μ.

(c) Compute the variance σ^2.

(d) Compute the standard deviation σ.

(e) Chebyshev's Theorem says that at least 75% of data falls within 2 standard deviations of the mean, in the interval $[\mu - 2\sigma, \mu + 2\sigma]$. Find such an interval for the artifact counts for these excavation sites.

Problems 6, 7	
Year	Average per game
2012	65,074
2011	64,698
2010	64,978
2009	65,043
2008	66,625
2007	67,755
2006	67,738
2005	66,455
2004	66,409
2003	66,328
2002	65,755
2001	65,187
2000	66,078
1999	65,349
1998	64,020
1997	62,364
1996	60,885
1995	62,682
1994	62,636
1993	62,352
1992	61,736
1991	61,792
1990	62,321
1989	60,829
1988	60,446
1987	54,315
1986	60,663
1985	59,567
1984	59,813
1983	59,273
1982	58,472
1981	60,745
1980	59,787
1979	58,848
1978	57,017
1977	56,218
1976	56,482
1975	56,116
1974	56,244
1973	58,961
1972	57,395
1971	55,363
1970	52,381

Problems 8, 9	
Year	Arctic Sea Ice (1,000,000 sq km)
1979	7.2
1980	7.85
1981	7.25
1982	7.45
1983	7.52
1984	7.17
1985	6.93
1986	7.54
1987	7.48
1988	7.49
1989	7.04
1990	6.24
1991	6.55
1992	7.55
1993	6.5
1994	7.18
1995	6.13
1996	7.88
1997	6.74
1998	6.56
1999	6.24
2000	6.32
2001	6.75
2002	5.96
2003	6.15
2004	6.05
2005	5.57
2006	5.92
2007	4.3
2008	4.68
2009	5.36
2010	4.9
2011	4.61
2012	3.61

data from Journal of Statistics Education (2013)

data on NFL attendance from www.nfl.com/history