Kerry Ojakian's MTH 23.5 Class
Due Date: Tuesday September 24 in class

HW #1

General Instructions:

- Homework must be relatively neat. The exercises must be done in order (if you skip an exercise, still write down the number and leave some blank space).
- You must show all work.
- While you may work with other students or tutors, do not copy someone else's work, whether a person or online source.

The Assignment

1. Choose a random sample of size 5 from among the integers 1 to 100. How did you choose your random sample?
2. Classify each of the following data according to the *level of measurement* (that is state whether it is nominal, ordinal, interval, or ratio):
   (a) The telephone numbers in a telephone directory.
   (b) The scores of a class in an exam.
   (c) Motion Picture Association of America ratings description (G, PG, PG-13, R, NC-17).
   (d) Average monthly precipitation in inches for New York, NY.
   (e) Average monthly temperature (in degrees Fahrenheit) for New York, NY.
   (f) Absolute temperatures (that is temperatures measured in Kelvin degrees).
3. Do the following conversions.
   (a) Convert 0.0587 to a percent.
   (b) Convert 43.765% to a decimal.
   (c) Convert 21/30 to a decimal.
   (d) Convert .4 to a fraction.
   (e) Convert 55% to a fraction.

4. Simplify the fraction

   (a) $\frac{4}{16}$

   (b) $\frac{2}{7}$

   (c) $\frac{28}{12}$

5. Use our class data (available as an Excel file at the webpage under Course Materials, the bottom link "Our Class Data"). From that file use the data from column choose a data column. Make a frequency table with 4 classes, then use this to make a histogram. Make a relative frequency histogram. Show all this work on paper (not using Excel).

6. Showing all the steps, calculate the range, mean, median, mode for the following population data.

   47 59 50 56 56 51 53 57 52 49

7. In the following problems you are *not* given the data, but told how many data items there are (i.e. given the N value). Your answers should give the requested locations to look at (for example: 34th spot or 137th spot, etc).

   (a) Suppose you have data with 200 data items. If you want to find the median, you should find the mean of which two data items?

   (b) Suppose you have 201 data items. If you want to find the median, which data item do you look at? If you want to go further and find the first quartile (Q1), then you should the mean of which two data items?

   (c) Suppose you have data with 199 data items. Find the following percentiles:
   a) 10th percentile, b) 70th percentile, c) 90th percentile.

8. Suppose we have the following two data sets:

   - $X:\ x_1 = 6,\ \ x_2 = -7,\ \ x_3 = 6,\ \ x_4 = 0,\ \ x_5 = 5$
   - $Y:\ y_1 = 34.9,\ \ y_2 = -30,\ \ y_3 = -34.9,\ \ y_4 = 30$

   Evaluate the following:

   (a) $\sum y$

   (b) $\left(\sum x\right) / 5$

9. A consumer testing service obtained the following mileage (in miles per gallon) in five test runs for three different types of compact cars:

	First Run	**Second Run**	**Third Run**	**Fourth Run**	**Fifth Run**
Car A	28	32	28	34	30
Car B	31	31	29	29	31
Car C	32	29	28	32	30

   (a) If the manufacturer of Car A wants to advertise that their car performed the best in this test, which measure of central tendency (mean, median or mode) should be used to support their claim?

   (b) Which measure should the manufacturer of Car B use to claim that their car performed best, mean median or mode?

   (c) Which measure should the manufacturer of Car C use to support a similar claim?

10. Perform the operation and simplify.

   (a) $100 \cdot 3 - 2 \cdot 10^2$

   (b) $|-5-2|$

11. Evaluate the following expressions at the given values.

   (a) $x + 13$ if $x = 5$

   (b) $5 + 2x$ if $x = 10$

   (c) $5a + 6b$ if $a = 4$, $b = -2$

   (d) $x^2 - y^2 + 3$ if $x = -2$, $y = 1$

   (e) $x^2 - y^2 + 3$ if $x = -1$, $y = -3$

12. If the temperature in Celsius is C, then the Fahrenheit temperature is $C \cdot \frac{9}{5} + 32$.

   If the temperature in Fahrenheit is F, then the Celsius temperature is $\frac{5}{9} \cdot (F - 32)$.

   (a) In Portugal you are told the temperature is 30 degrees Celsius. What is the temperature in Fahrenheit?

   (b) In NYC you hear it is 41 degrees Fahrenheit. So they understand you in Portugal, convert this to Celsius.

   (c) Zero degrees Celsius is when water freezes. What temperature does water freeze in Fahrenheit?

   (d) 100 degrees Fahrenheit is hot! What is that in Celsius?