Chapter 6: Z-Scores and the Normal Model

Z-SCORES

1. A French placement exam has a mean of 72 and a standard deviation of 8. A math placement exam has a mean score of 68 and a standard deviation of 12.
   a) Ann scored 82 on the French exam, and 86 on the math exam. Compute z-scores for Ann's scores.

      FRENCH: z = (82-72)/8 = 1.25 MATH: z = (86 – 68)/12 = 1.5

   b) On which exam did Ann perform better than other freshmen?

      MATH BECAUSE THE Z SCORE IS HIGHER

   c) Sue scored 86 on the French exam, and 82 on the math exam. Can Sue claim she performed better than Ann? Why or why not?

      SUE FRENCH: Z = (86-72)/8 = 1.75 SUE MATH: Z = (82 – 68)/12 = 1.17
      SUE COMBINED: 1.75 + 1.17 = 2.92 ANN COMBINED: 1.25 + 1.5 = 2.75
      THEREFORE, SUE DID PERFORM BETTER, COMPARED TO THE REST OF THE CLASS.

SHIFTING/RESCALING DATA

1. If we change the units of data from inches to feet, we need to
   a) Change the mean by
      DIVIDE BY 12

   b) Change the standard deviation by
      DIVIDE BY 12

   c) Change the median by
      DIVIDE BY 12

   d) Change the IQR by
      DIVIDE BY 12

   e) Change the shape by
      NO CHANGE

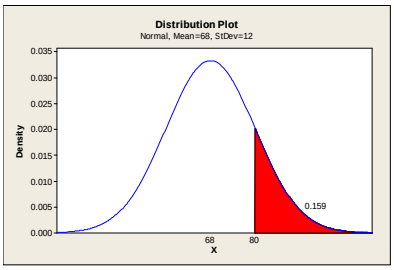
2. Standardized values (z-scores) have
   a) Mean = 0

   b) Standard Deviation = 1

NORMAL PERCENTILES

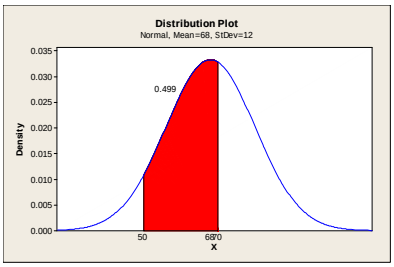
3. Using the information in #1, assume that the exam scores are nearly normal.
   a) What percent of students score over 80 on the math exam? Include an appropriate diagram.

      0.159



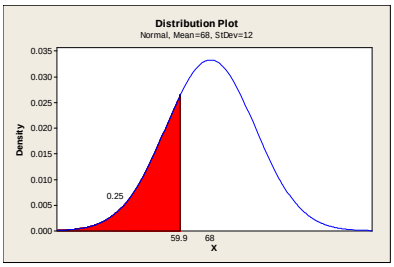
b) What percent of students score between 50 and 70 on the math exam? Include an appropriate diagram.

0.499



c) What is the cutoff value for the lowest 25% of scores on the math exam? Include an appropriate diagram.

59.9



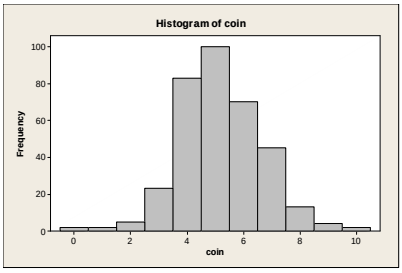
ASSESSING NORMALITY

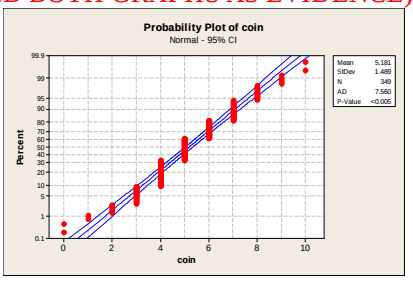
Data Set:

- Math 140 Survey Results
- http://www.canyons.edu/faculty/morrowa/140/datasets/
- Focus on the quantitative variables only
- Note: Questions are online at http://classes.thegradekeeper.com/math140.php (if you need a reminder).

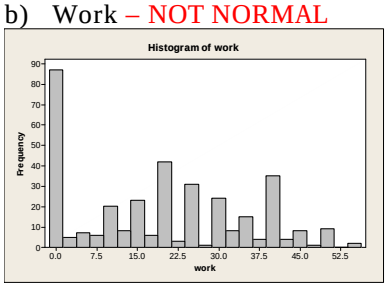
4. Determine if the following are nearly normal (include appropriate graphs to support your answer):

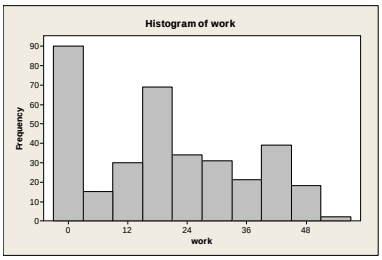
a) Coin -- NEARLY NORMAL (NOTE: NEED BOTH GRAPHS AS EVIDENCE)

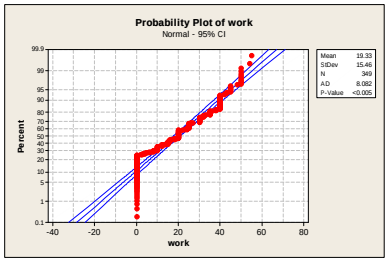


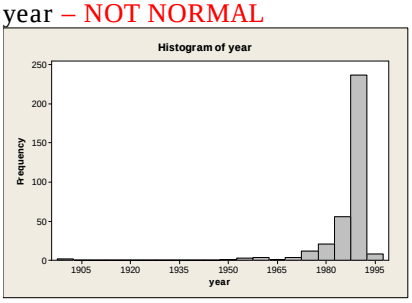
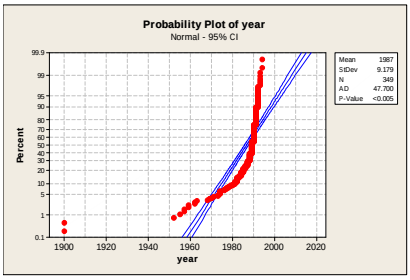


b) Work – NOT NORMAL







(Better histogram…)

c) year – NOT NORMAL