AP Statistics
HW 2.2 Part C pages 133 - 135
Problems 63, 64, 65, 66, 68, 69 - 74

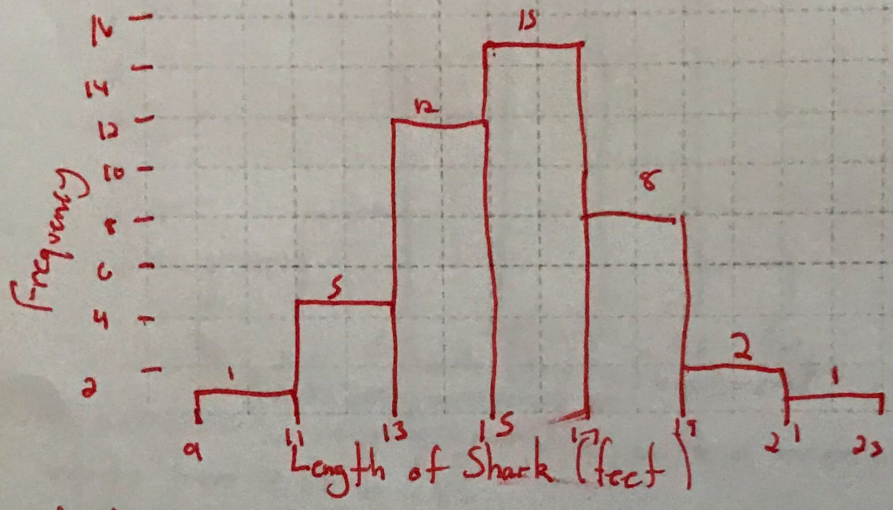
Name_____
Date_____ Hour_____

63) **Sharks** Here are the lengths in feet of 44 great white sharks:

18.7	12.3	18.6	16.4	15.7	18.3	14.6	15.8	14.9	17.6	12.1
16.4	16.7	17.8	16.2	12.6	17.8	13.8	12.2	15.2	14.7	12.4
13.2	15.8	14.3	10.6	9.4	18.2	13.2	13.6	15.3	16.1	13.5
19.1	16.2	22.8	16.8	15.6	13.2	15.7	19.7	18.7	13.2	16.8

a) Enter these data into your calculator and make a histogram. Then calculate one-variable statistics. Describe the shape, center, and spread of the distribution of shark lengths.

Variable: Shark Length
$N = 44$
$\bar{x} = 15.586$
$s.d = 2.550$
$min = 9.4$
$Q_1 = 13.55$
$med = 15.75$
$Q_3 = 17.2$
$max = 22.8$



The distribution of shark lengths is roughly symmetric with a peak from 15-17 and varies from 9.4 to 22.8 feet

(b) Calculate the percent of observations that fall within one, two, and three standard deviations of the mean. How do these results compare with the 68-95-99.7 rule?

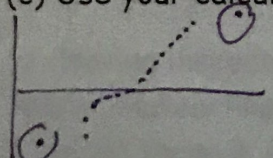
$\pm 1 sx$ (13.036, 18.136) = 30/44 ≈ 68.2%

$\pm 2 sx$ (10.486, 20.686) = 42/44 ≈ 95.5%

$\pm 3 sx$ (7.936, 23.236) = 44/44 = 100%

These results are very close to the 68-95-99.7 rule.

(c) Use your calculator to construct a Normal probability plot. Interpret this plot.



Except for 1 small shark and 1 large shark, the plot is fairly linear, indicating that the lengths are approximately Normal.

(d) Having inspected the data from several different perspectives, do you think these data are approximately Normal? Write a brief summary of your assessment that combines your findings from (a) through (c).

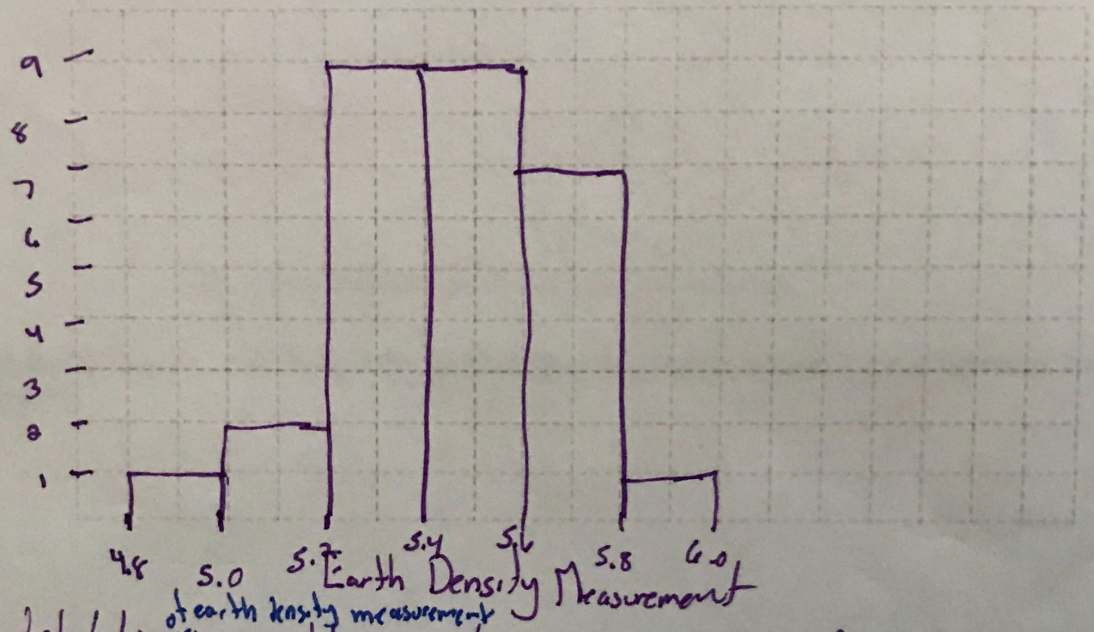
All 3 checks indicate the shark lengths are approximately normal.

64. **Density of the earth.** In 1798 the English scientist Henry Cavendish measured the density of the earth by careful work with a torsion balance. The variable recorded was the density of the earth as a multiple of the density of water. Here are Cavendish's 29 measurements

5.50 5.61 4.88 5.07 5.26 5.55 5.36 5.29 5.58 5.65 5.57 5.53 5.62 5.29 5.44 5.34 5.79 5.10 5.27
5.39 5.42 5.47 5.63 5.34 5.46 5.30 5.75 5.68 5.85

a) Enter these data into your calculator and make a histogram. Then calculate one-variable statistics. Describe the shape, center, and spread of the distribution of shark lengths.

Variable: Density
N = 29
$\bar{x}$ = 5.448
s_x = .221
min = 4.88
Q_1 = 5.295
med = 5.46
Q_3 = 5.615
max = 5.85



The distribution of earth density measurement is roughly symmetric, with a mean of 5.448, and varies from 4.88 to 5.85

(b) Calculate the percent of observations that fall within one, two, and three standard deviations of the mean. How do these results compare with the 68-95-99.7 rule?

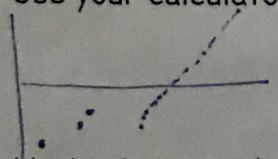
$\pm 1s_x$ = (5.227, 5.669) = 22/29 ≈ 75.9%

$\pm 2s_x$ (5.006, 5.89) = 28/29 ≈ 96.6%

$\pm 3x$ (4.785, 6.111) = 29/29 = 100%

These results are fairly close to the 68-95-99.7 rule.

(c) Use your calculator to construct a Normal probability plot. Interpret this plot.



The normal probability plot is roughly linear, indicating that the densities are ≈ Normal.

(d) Having inspected the data from several different perspectives, do you think these data are approximately Normal? Write a brief summary of your assessment that combines your findings from (a) through (c).

All 3 ✓s indicate that these measurements are approximately normal.

Htw 2.2 Part C pages 133-135 prob 63, 64, 65, 66, 68, 69-74

(65) You can see that the distribution is close to Normal b/c the plot is roughly linear. The smallest value is smaller than we would expect and the largest two values are larger than we would expect. There is also a cluster of points around 125 bpm that are larger than expected.

(66) The shape of the Normal probability plot suggests the data are right skewed. This can be seen in the steep, nearly vertical section in the lower left (these H's were less spread out than Normal data) and the 3 apparent outliers that deviate from the line in the upper right (these were much larger than they would be for a Normal distribution)

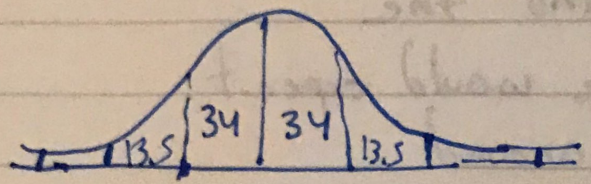
(68) Weights women aged 20-29: $\bar{x} = 141.7$ median = 133.2 $Q_1 = 118.3$
$Q_3 = 157.3$

The mean is higher than the median.
This indicates the distribution is skewed right.
Also Med - Q_1 = 133.2 - 118.3 = 14.9 pounds and
Q_3 - M = 157.3 - 133.2 = 24.1 pounds
There is a bigger spread from Med to Q_3 compared to Q_1 and me
This also indicates distribution is skewed toward the right.

(69) D

(70) $N(80, 2)$ Point $C = 80 - 2 = 78$ [C]

(71)



95%

76 - 84

[B]

(72) $X < 78$ $13.5 + 2.35 + .15 = 16\%$ [C]

(73) normalcdf $(-1000, 1.15, 0, 1) = .8749$ [C]

(74) normalcdf $(-0.75, 1000, 0, 1) = .7734$ [C]