

Instructions: Show all work. If you use your calculator to answer problems, note the steps taken to enter the data in the calculator and commands used as the “show work” component. It may help to copy all input and output screens, and then interpret the results when answering. Answers without any work may only be worth 1 point per question. Round appropriately for each question.

1. For each of the variables below, determine the type of variable it is: a) qualitative or quantitative, b) level of measurement, c) if the variable is quantitative, is it discrete or continuous? (6 points each)

i. Type of fruit *qualitative, nominal*

ii. SAT scores (Hint: SATs have a range of 200-800 on each of three tests)
quantitative, discrete, interval

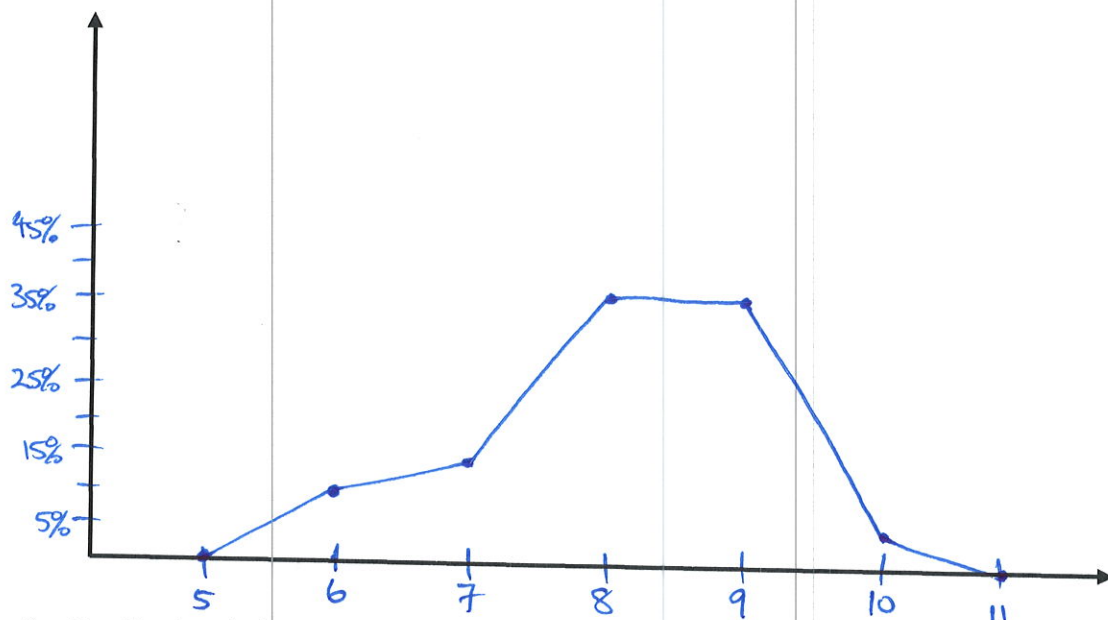
iii. Social class *qualitative, ordinal*

2. The frequency table below gives scores for the number of students in a statistics class who got a particular score on a 10-point quiz. Fill in the relative frequency values for each score in the last column. (10 points)

Score	Frequency	Relative Frequency (round your answers to one decimal place)	
6	2	$\frac{2}{20}$	10%
7	3	$\frac{3}{20}$	15%
8	7	$\frac{7}{20}$	35%
9	7	$\frac{7}{20}$	35%
10	1	$\frac{1}{20}$	5%
<i>Total : 20</i>			

*10.0%
etc.*

Use the space on the next page to sketch the graph of the relative frequency polygon. Be sure to label your graph appropriately. (10 points)



3. Use the data below to calculate the following descriptive statistics: (3 points each)

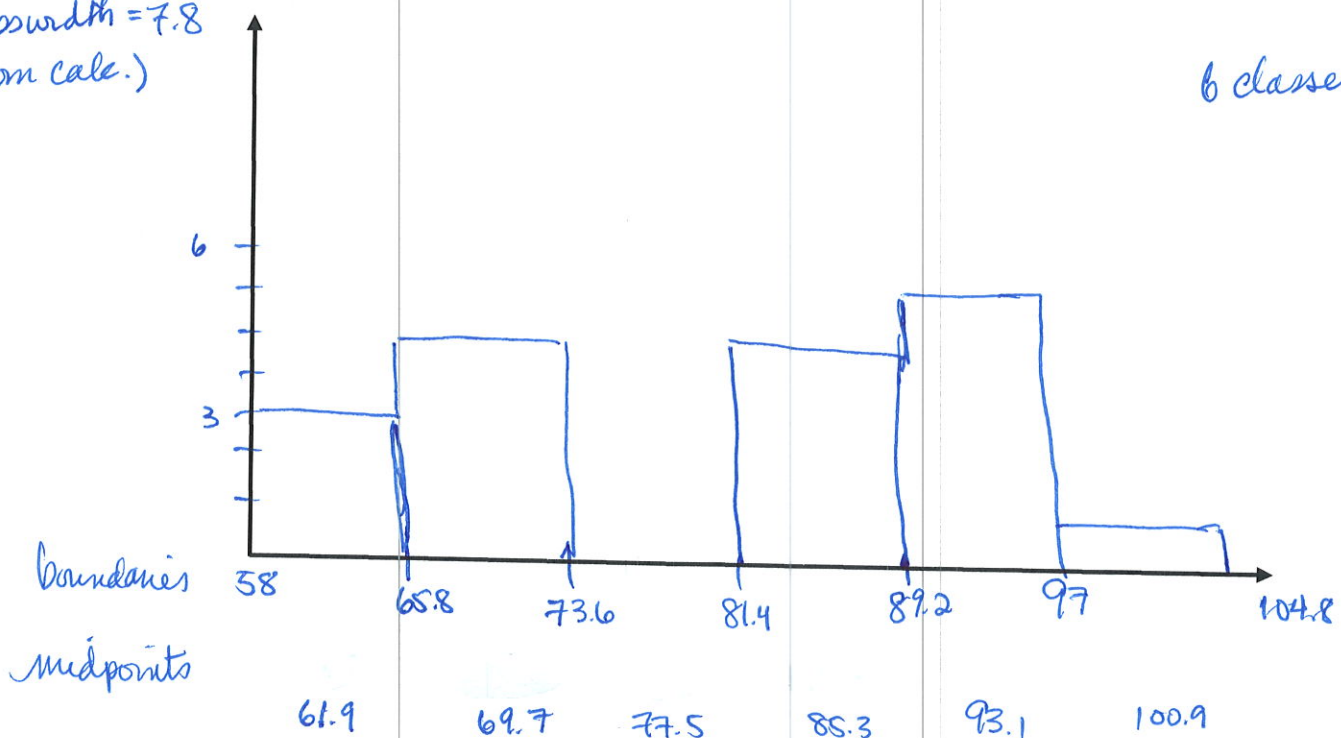
- a. Mean $\bar{x} = 80.8$
- b. Median $\tilde{x} = 84$
- c. Mode *no mode : 83, 92, 96 all appear twice*
- d. Range $97 - 58 = 39$
- e. Standard Deviation $13.395 \sim 13.40$

66	96	72	97	69	95	68
65	59	92	88	71	85	94
58	87	83	92	83	96	

Use the graph below to draw a histogram of the data with 5-6 classes. Fill in the table on the next page with the class boundaries and the class midpoints, along with the frequencies. (20 points)

*Classwidth = 7.8
(from calc.)*

6 classes



Class Range	Class Midpoint	Frequency
[58, 65.8)	61.9	3
[65.8, 73.6)	69.7	5
[73.6, 81.4)	77.5	0
[81.4, 89.2)	85.3	5
[89.2, 97)	93.1	6
[97, 104.8)	100.9	1

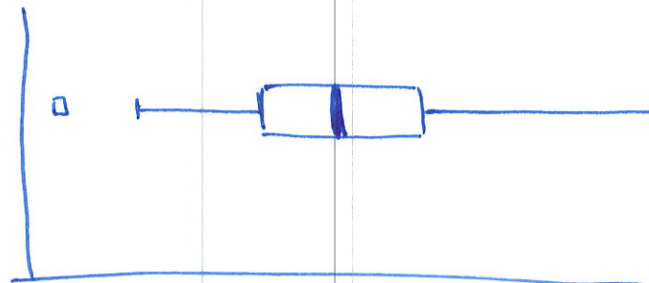
4. Below is data in a stem-and-leaf plot.

Stem	Leaf
4	0
5	4 6
6	0 0 3 3 5 5 7 7 9
7	0 0 1 1 1 2 3 4 6 7 7 9
8	0 0 0 3
9	0 2 3
10	1

Key: 6|0 = 60.

Use this data to construct a box-and-whisker plot. Be sure to clearly state the median, mode, range, the first and third quartiles. Determine if there are any outliers in the data set. Sketch the graph of the boxplot below. (20 points)

\checkmark min = 40
 $Q_1 = 65$
 Med = 71
 $Q_3 = 79.5$
 max = 101



There is an outlier (40)

$IQR = 14.5$

$1.5 * 14.5 = 21.75$

$65 - 21.75 = 43.25$ any value below this is an outlier

$79.5 + 21.75 = 101.25$ any value above this is an outlier

5. The data in the graph above was drawn from a normal distribution with a mean of 72 and a standard deviation of 10. What is the z-score for the value 92? What percentile does this represent? (6 points)

$$z = \frac{92 - 72}{10} = 2$$

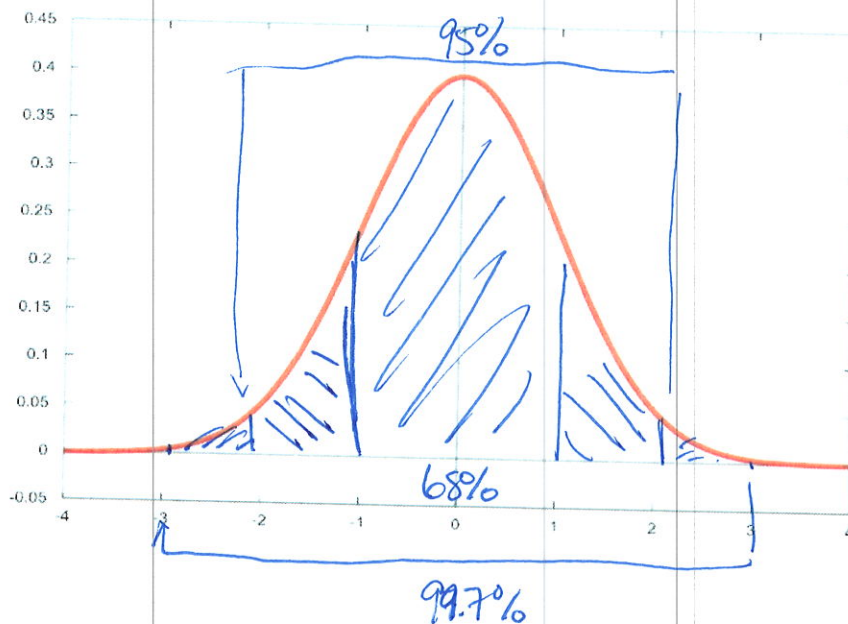
$$\text{normalcdf}(-E99, 2) = .97724$$

approx 97th percentile

6. For the distribution shown below, determine the shape of the distribution (symmetric, uniform, skewed right, skewed left, normal, etc.). Label the relative positions on the graph of the mean, median and mode. (5 points)

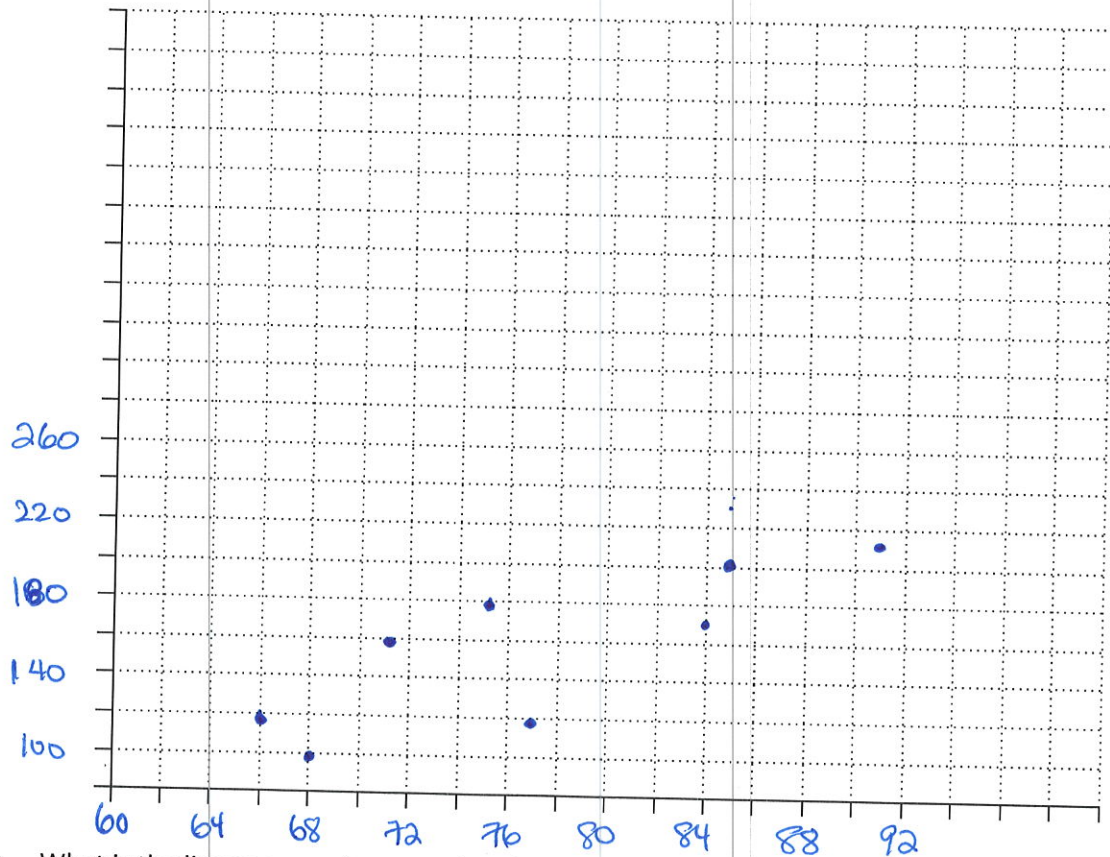


7. Below is the graph of a standard normal distribution (with a mean of 0 and a standard deviation of 1). Use the graph to illustrate the Empirical Rule. (6 points)



8. Below is a graph of the relationship between temperature and ice cream sales. Use the information to draw a scatterplot. Find the least-squares regression line and place it on the graph. Be sure to label the graph appropriately. Then answer the questions below the graph. (15 points)

Temperature	Ice Cream Sales
85	\$200
71	\$160
84	\$170
66	\$120
77	\$120
75	\$180
68	\$100
91	\$230



- a. What is the linear regression equation that best fits the data? (3 points)

$$y = 4.193x - 163.410$$

- b. What is the correlation coefficient? (3 points)

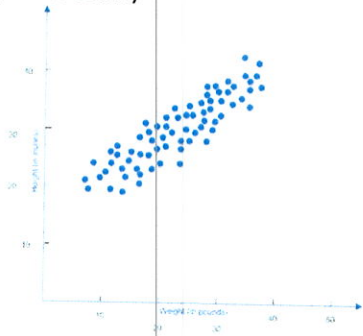
$$r = .8378$$

- c. What is the proportion of the variation explained by the relationship between temperature and ice cream sales? (3 points)

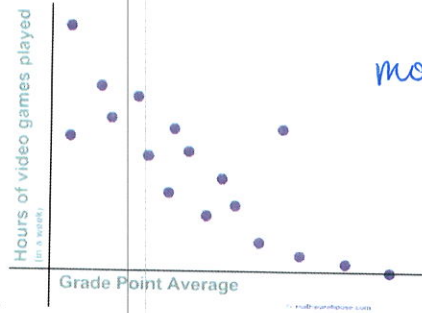
$$\approx 70\%$$

9. For each of the graphs below, estimate the correlation value (including the sign). You may choose from Strong ($|r| > 0.7$), moderate ($0.4 < |r| < 0.7$), weak ($|r| < 0.4$), or none ($r \approx 0$). (4 points each)

Strong
 $r > .7$



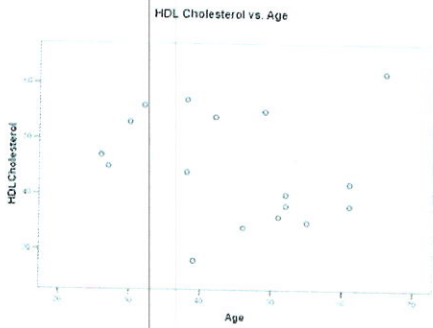
a.



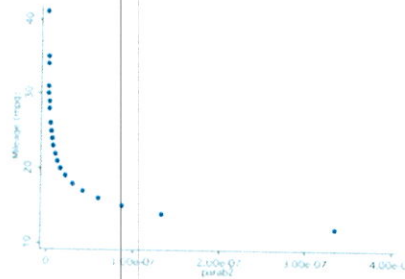
moderate to strong
 $\approx .7$

c.

None
 $r \approx 0$



b.



moderate to weak
 $r \approx .4$

d.