1. (6 points) The next questions refer to the list {-1, -11, -8, 0}.

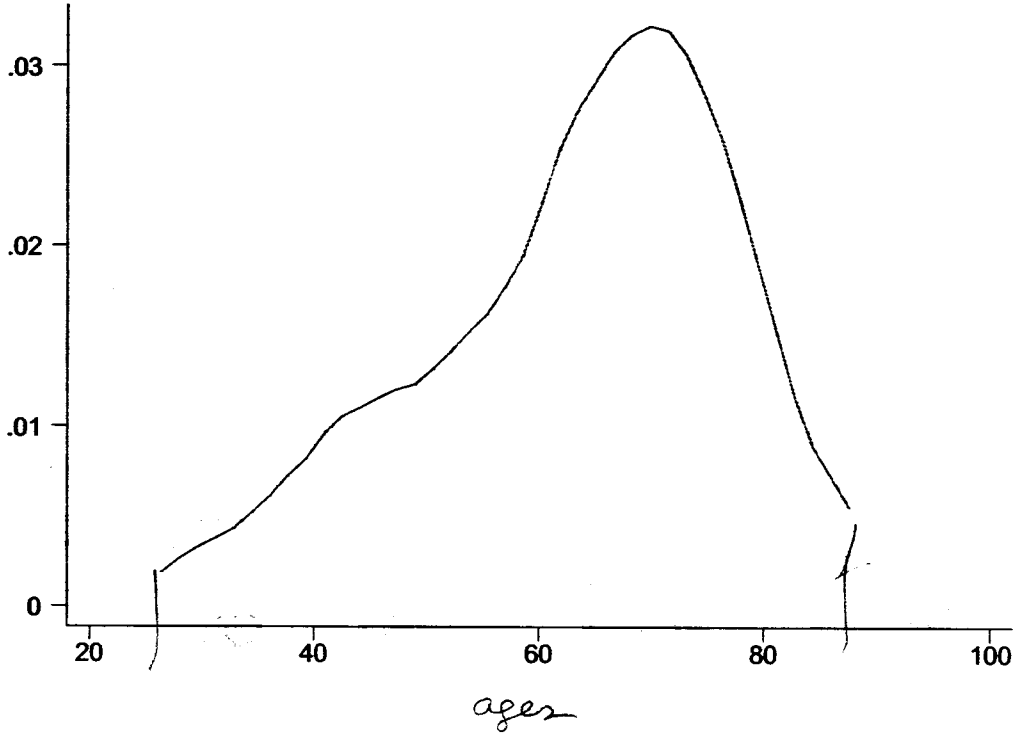
a. What is the mean of this list?

$$\frac{-1 + -11 + -8 + 0}{4} = -5$$

b. What is the standard deviation of this list?

$$S = \sqrt{\frac{(-1+5)^2 + (-11+5)^2 + (-8+5)^2 + (0+5)^2}{4}} = \sqrt{\frac{16+36+9+25}{4}} = 4.64$$

2. Here is a histogram, please assume it was correctly drawn



Please answer the following questions about this histogram:

True	False	Statement
✓		This histogram is left skewed
	✓	This histogram is right skewed
✓		The total area is 1.0 or 100%
	✓	If the X axis represents ages, the implied Y axis labeling is age per percent
	✓	The mean is greater than the median

644

3.(8 points) To study the effects of exercise on the grades of college students, a researcher wishes to compare the grade point averages of students at randomly selected colleges across the United States. The researcher selects students at random and after interviewing them to find out who exercises and who does not, chose 322 students of each (exercisers and non-exercisers). The researcher made sure the two groups of 322 were similar in racial composition, gender, major, and every subject had accumulated at least 110 units towards graduation. There were a total of 644 students in the study from approximately 30 colleges, their overall GPA was 3.02. The average GPA for the students who exercised was 3.22 and the standard deviation was .44.

a. Is this an observational study or an experiment?
observational study

b. From this study, an example of a sample statistic is:
mean for exercisers = 3.22

c. What is the "treatment"?
exercise

d. What is the response or outcome variable?
GPA

e. What is the population of interest?
College students

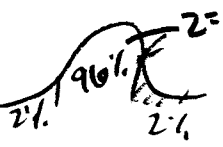
f. What is the parameter of interest in this study?
GPA of non exercisers & exercisers of all college students (effect of exercise on grades)

4. (6 points) Classify the following variables as either categorical or numerical by checking the correct box, if it is a numerical variable, further classify the variable as either discrete or continuous:

	Variable	Categorical	Numerical	Discrete	Continuous
A	Human Body Temperature		✓		✓
B	Eye color	✓			
C	Number of people on a bus		✓	✓	
D	Automobile Company Names	✓			

The last three questions use information from this statement, but each question is separate (i.e. you can get the first one wrong and it won't affect the others): A recent study showed that the gambling income of adults age 21 and over in the United States from all forms of legalized gambling (e.g. lottery, video poker, horse racing, casinos) is normally distributed with a mean of -150 dollars (a loss) and a standard deviation of $275. SHOW YOUR WORK FOR FULL CREDIT.

5. It is believed that the gamblers with the highest winnings, that is those with the highest 2% of gambling income, should be considered gambling "professionals" and should be excluded from further study. How much money does a gambling adult need to win to be considered a "professional"? (5 points)



$z = \frac{x-\mu}{\sigma}$

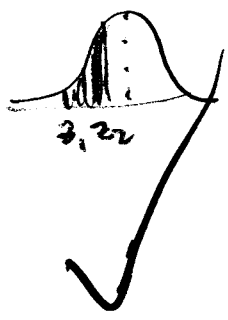
$2.05 = \frac{x-(-150)}{275}$

$563.75 = x + 150$

$x = \$413.75$ or more

6. What percentage of adults age 21 and over had gambling losses of at least $250 but not more than $500? (7 points)

-500 to -250



$z_1 = \frac{-500 - -150}{275}$ $z_2 = \frac{-250 - -150}{275}$

$z_1 = -1.27$ (≈ -1.25) $z_2 = -.36$ ($\approx -.35$)

$\frac{78.81}{2} - \frac{27.37}{2} =$ 25.75%.

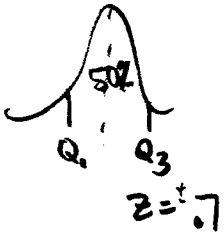
7. What is the median gambling income? What is the interquartile range for gambling income? (8 points)

normally distributed data

median = mean = $-150

interquartile range = $Q_3 - Q_1$ (spread of mid 50%)

75th - 25th



$z = \pm .7 = \frac{X + -150}{275}$

$\pm 192.5 = X + 150$

$X = \$42.50$ Q_3

$\$-342.5$ Q_1

$42.50 to $-342.50

range → $385