1.(2 points each part) Identify each study as being either observational or experimental by checking off the appropriate column.

| Observational | Experimental | |
|---|---|---|
| | X | a. Human subjects were randomized into two groups. One group was given an herbal remedy, the other group a placebo. After six months, the number of colds or flus each group had were compared. |
| X | | b. A researcher stood at a randomly selected busy intersection to see if the color of an automobile a person drives is related to running red lights. |
| X | | c. A researcher finds that people who are more hostile have higher rates of heart disease than people who are less hostile. |
| | X | d. Subjects are assigned to one of four groups. Each group is placed on one of four special diets -- a low fat diet, a high-fat diet, a low calorie diet, and a regular diet. After six months, the blood pressures of the groups are compared to see if diet has any effect on blood pressure. |
| X | | e. Psychiatrists examined some randomly selected prison records. They found inmates whose mothers smoked during pregnancy were 10 times more likely to be incarcerated for murder. |

2. (2 points) The formula for converting raw SAT Verbal scores into SAT Verbal scores for distribution to universities and colleges is:

SAT Verbal = 3.1 (raw score + 200)

Which statement below is correct about a dataset of raw SAT verbal scores after the change of scale

A. The mean of the dataset will change, but the median will remain the same
B. The mean and median of the dataset will change, but the standard deviation will remain the same.
C. The range will remain the same but the standard deviation will change.
D. The mean and standard deviation will change, but the median will remain the same.
E. All of the above are false.

3.(5 points) Explain how the relation between the mean and the median provides information about the symmetry or skewness (asymmetry) of the distribution (pattern) of any histogram of data. BE BRIEF.

1) IDENTIFY that in symmetrical distributions mean = median

2) IDENTIFY that in distributions w/ a long right handed tail mean > median

3) IDENTIFY that in a distribution w/ a long left handed tail mean < median

4. Here is unemployment data from 10 countries:

| Country | Unemployment Rate |
|---|---|
| Australia | 8.7 |
| Canada | 9.2 |
| France | 12.4 |
| Germany | 10.0 |
| Great Britain | 7.0 |
| Ireland | 31.3 |
| Italy | 12.1 |
| Japan | 3.4 |
| Sweden | 9.9 |
| United States | 4.9 |

a. Find the mean unemployment rate (2 points)

A. 9.55
B. 9.9
C. 10.9
D. 19.2
E. None of the above

b.Find the median unemployment rate (3 points)

A. 9.55
B. 9.9
C. 10.9
D. 19.2
E. None of the above

3.4, 4.9, 7.0, 8.7, 9.2 | 9.9, 10.1, 12.1, 12.4, 31.3

$\frac{9.2+9.9}{2} = 9.55$

c.Find the standard deviation of unemployment rate (4 points)

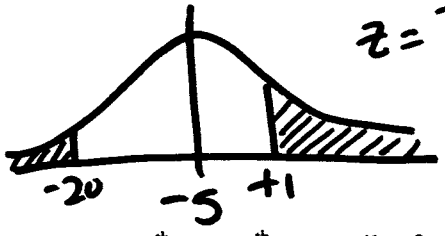
A. 7.3
B. 7.7
C. greater than 10
D. less than 5
E. None of the above

d. Find the Z score for the United States using information from the table above, the standard normal table, and from parts a and c. (4 points)

5. Ice Cream must be stored at temperatures between -20 and +1 degrees Celsius to remain usable Suppose the freezer units belonging to a large grocery store chain (like Ralph's or Vons) produce storage temperatures that are normally distributed with a mean of -5 degrees Celsius and a standard deviation of 10 degrees Celsius. Please answer the following questions about the ice cream being sold to customers.

a. What percentage of freezers are too warm or too cold to properly store ice cream? (3 points)

A. 34.1%
B. 35.1%
C. 41.1%
D. 65.9%
E. none of the above




$z = \frac{+1-(-5)}{10} = +.6$

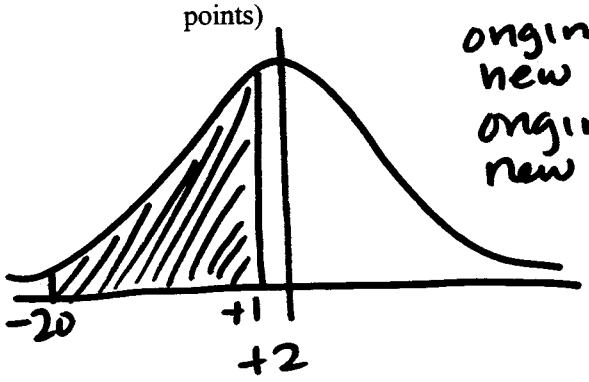
$z = \frac{-20-(-5)}{10} = -1.5$

b. What values of freezer temperatures represent the 25th and 75th percentiles for this distribution? (2 points each percentile value, 4 points total)

25th $-.65 = \frac{x-(-5)}{10}$ solve $\Rightarrow x \Rightarrow -11.5^{\circ}$

75th $+.65 = \frac{x-(-5)}{10} \Rightarrow x \Rightarrow +1.5$

c. Suppose the thermometers used to measure the temperature of the freezer units are inaccurate and actually all of the freezer units are 7 degrees warmer than reported above. What percentage of their freezers are capable of properly storing ice cream now? (3 points)




orginal mean = -5
new mean = +2
orginal SD = 10
new SD = 10

$z_{+1} = \frac{+1-(2)}{10} = -.1$ → 7.97% area

$z_{-20} = \frac{-20-(2)}{10} = -2.2$ → 97.22% area

$\frac{97.22-7.97}{2} = 44.6\%$