Sample Exam 1 Solutions– Math 263 (sect 9)

1.

(a) The percentage of students with under $10.00 in their possession is C) 44%

(b) The median is approximately B) $11
(c) Distribution is skewed right, so the median will be (ii) to the left of the mean
(d) Q1 is about 5, Q3 is about 20, so IQR is B) $15.
(e) There were 42 students who had between $10 and $20 in their possession.

2.

(a) What proportion of candidates takes more than two hours to learn the computer system? z=(120-90)/18=1.66667. From tables or calculator the proportion below this is 0.9522, so the proportion about it is 1-0.9522=0.478=4.78%

(b) What proportion of candidates will be hired automatically? z=(100-90)/18=0.55556 Proportion less than this is 0.7107=71.07 %

(c) What is the cut-off time the market research company uses? The slowest typists are the ones with the longest times. So we want the 90^{th} percentile for times. For standard normal the 90^{th} percentile is at 1.28. So if x is the cutoff time, then 1.28=(x-90)/18. So x= 113mins. They won't hire anyone who takes longer than 113 mins.

(d) The distribution is symmetric about the mean of 90. So 12.5% of the times are less than 75 mins. For the standard normal the z value below which we have 12.5% is -1.15. This corresponds to time of 75 mins. So if s is the standard deviation, 1.15 s=15. So x=13.04 mins.

3. For the standard normal the 1^{th} percentile is at z= -2.33. This corresponds to a weight of 202g - 2.33 x 3g = 195g

4. (a) What is the median salary of the 20 employees? 48

(b) What is the first quartile of the 20 salaries? 39

(c) What is the interquartile range of the 20 salaries? 60.5-39=21.5

(d)
A) The median salary would increase by $3000
B) The interquartile range of the salaries would not change. (Both Q1 and Q3 increase by $3000).
C) The standard deviation of the salaries would not change.

(e) For each of the following sentences, fill in the blank.

A) The maximum salary is approximately 97,000 dollars.

B) The minimum salary is approximately 36,000 dollars.

C) The interquartile range is approximately 20,000 dollars.

D) Seventy-five percent of the employees in this sample of 20 earn more than approximately 45,000 dollars.

(f) Based on this boxplot, answer each of the following questions with yes, no, or can't tell.

A) Is the salary distribution heavily skewed? No, not heavily

B) Do about 10 employees make more than $55,000? Yes, this is approximately the median.

C) Does nobody make more than $71,000? No, there is one person making about $97,000.

D) Is the range of the salaries roughly $35,000? No, it is roughly $97,000-$35,000=$62,000

5. Match the four graphs labeled A, B, C, and D, with the following four possible values of the correlation coefficient: –0.9, –0.7, 0.4, 0.95. Assume all four graphs are made on the same scale.

A) -0.9

B) 0.95

C) 0.4

D) -0.7

6. (a) r=0.9783

(b) (ACT score)= 0.01627 x (SAT score) -3.065

(c) No, there is a strong correlation, but correlation does not imply causation. A more likely scenario is that there is a lurking variable, for example, the student's intelligence or ability to take these type of tests, that has a casual relation with both of the tests.

(d) Prediction is 0.01627 x 1225 -3.065=16.9

(e) For every 100 points increase in the students SAT score we expect an increase of 1.627 points in his or her ACT score.