

Final Exam Review, Part II

(1) True or False (circle):

- a. 95% of the data in a frequency distribution will be in a 95% confidence interval for μ . TRUE FALSE
- b. Outliers are defined as data outside the IQR. TRUE FALSE
- c. In a normal distribution, roughly 90% of all data values will lie between two standard deviations of the mean. TRUE FALSE
- d. H_0 is the null hypothesis. TRUE FALSE
- e. In the standard normal distribution, $\mu = 1$ and $\sigma = -1$. TRUE FALSE
- f. \bar{X} is at the center of every confidence interval for μ . TRUE FALSE
- g. If $p < 0.01$, we reject H_0 . TRUE FALSE
- h. For combinations, order is not important. TRUE FALSE
- i. The median is the most frequently occurring data value in a set. TRUE FALSE
- j. s is the population standard deviation TRUE FALSE

(2) Read about the study described here and classify each of the variables below.

To find out when in their lives people are happiest, researchers randomly surveyed 125 individuals. In the survey, participants were asked for their age as well as ten questions pertaining to their quality of life. From those ten questions, each participant was given a “happiness” score between 0 and 100 (0 is the least happy, 100 the happiest). Statistical analysis determined that the happiest time of an American’s life happens between ages 44 and 51

Glossary: Qual = Qualitative N = Nominal Ind = Independent
 Quant = Quantitative O = Ordinal Dep = Dependent
 Disc = Discrete I = Interval Con= Confounding
 Cont = Continuous R = Ratio

	<u>Qual or Quant</u>	<u>Disc or Cont</u>	<u>Level of Measurement</u>	<u>Role</u>
City of Residence:	Qual – Quant	Disc – Cont	N – O – I – R	Ind – Dep – Con
Age:	Qual – Quant	Disc – Cont	N – O – I – R	Ind – Dep – Con
Happiness Score:	Qual – Quant	Disc – Cont	N – O – I – R	Ind – Dep – Con
Gender:	Qual – Quant	Disc – Cont	N – O – I – R	Ind – Dep – Con
Air Temperature	Qual – Quant	Disc – Cont	N – O – I – R	Ind – Dep – Con

(3) Two cards are drawn from a standard 52-card deck. What is the probability that both of the cards are hearts?

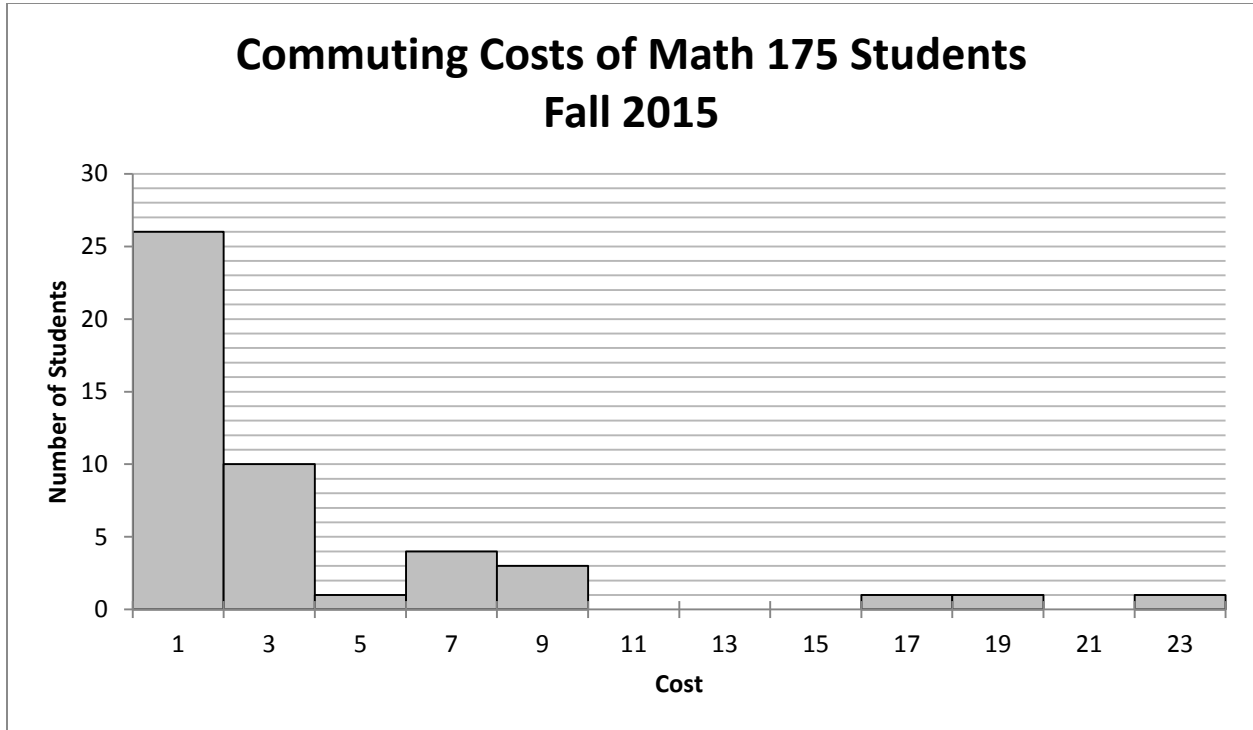
(4) In a psychology study, subjects are asked several questions that are used to compute a personality score. The personality score is normally distributed with a mean of 75 points with a standard deviation of 10 points.

a. What is the percentile rank of a person with a personality score of 62?

b. What personality score can be considered the 87th percentile?

(5) In a sample of 40 local Italian restaurants, the cost for a bowl of Italian wedding soup is normally distributed with sample mean \$5.24 and sample standard deviation \$0.43. Find a 95% confidence interval for the true population mean cost of Italian wedding soup in this area.

(6) On the first day of class last fall, students in both sections of Math 175 students were asked, “How much did it cost you to commute to school today?” The responses are shown in the histogram below. Answer the following questions about the data.



(a) How many Math 175 students were in class on the first day?

(b) What is the shape of the frequency distribution? (circle one)

Normal

Uniform

Bimodal

Skewed Left

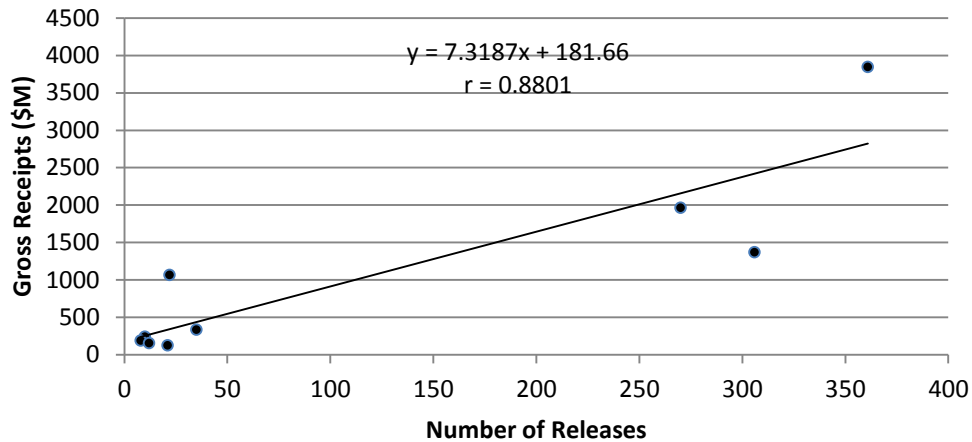
Skewed Right

(c) In the space below, draw a cumulative frequency polygon for the data.



(7) A paper manufacturer claims that the thickness of their standard office paper is 0.08 mm. However, in a sample of 65 pages of paper taken from the paper mill, the average thickness was 0.09 mm with standard deviation 0.01 mm. For packaging purposes this is too large. Give the maximum confidence level for which you claim that the average thickness is actually larger than 0.08 mm.

(8) The scatterplot below shows the data for 9 new movie releases.



- Is the correlation significant? YES NO
- If so, what number of releases would provide a studio with 3 Billion in gross receipts?

(9) Draw a stem and leaf plot for the data on the right:

4	20	29	33
8	21	30	33
10	24	30	34
11	25	30	35
15	26	31	35
16	26	32	36
16	27	32	38
18	27	32	40
19	28	33	43
19	29	33	45

(10) The unemployment rate in Allegheny County is 6.8%. If 40 county residents are selected at random, what is the probability that 10 of them are unemployed?

FORMULAS

$$P(X) = {}_n C_x p^x (1-p)^{n-x}$$

$${}_n C_r = \frac{n!}{r!(n-r)!}$$

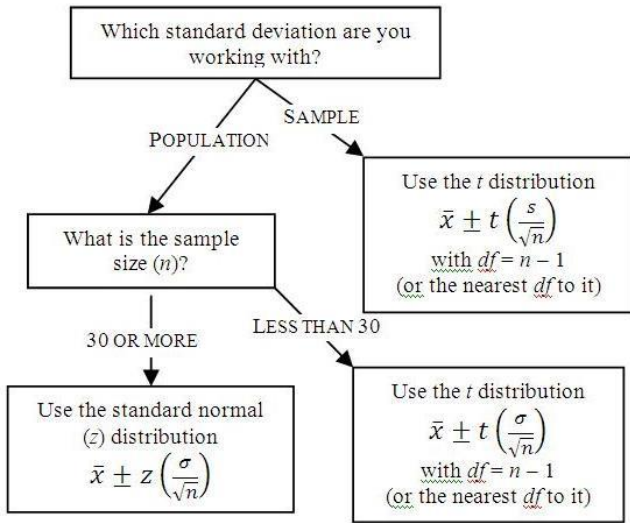
$${}_n P_r = \frac{n!}{(n-r)!}$$

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

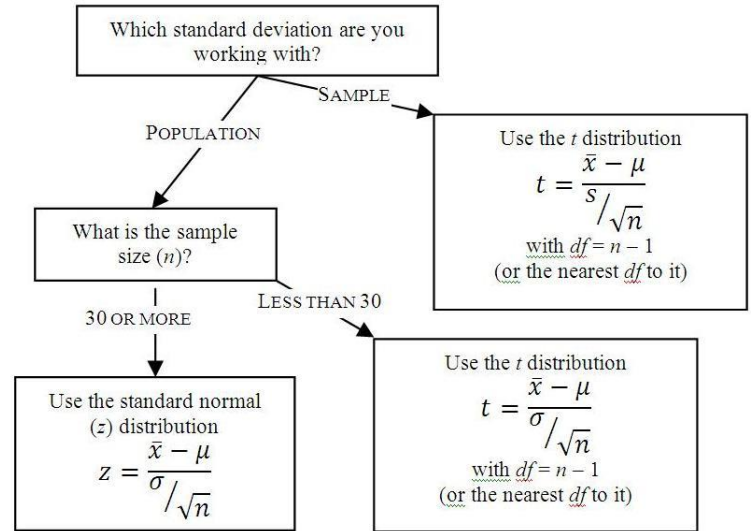
$$Q_1 - 1.5(IQR)$$

$$Q_3 + 1.5(IQR)$$

Confidence Intervals for Mean



Hypothesis Testing for Mean



More Confidence Intervals Formulas

$$\hat{p} \pm z \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

$$\left(\sqrt{\frac{(n-1)s^2}{\chi_r^2}}, \sqrt{\frac{(n-1)s^2}{\chi_l^2}} \right)$$

$$n = \left(\frac{z\sigma}{E} \right)^2$$

$$n = \left(\frac{z}{2E} \right)^2$$

More Hypothesis Testing Formulas

$$z = \frac{\hat{p}-p}{\sqrt{\frac{p(1-p)}{n}}}$$

$$\chi^2 = \frac{(n-1)s^2}{\sigma^2}$$