

Spring 2018 Final Review Questions (Updated 5/10/18)

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Problem 1.) A researcher claims that 86% of college graduates say their college degree has been a good investment. In a random sample of 1000 graduates, 845 say their college degree has been a good investment. At $\alpha = 0.10$, is there enough evidence to reject the researcher's claim?

Problem 2.) An industrial psychologist administered a personality inventory test for passive-aggressive traits to 150 employees. Each individual was given a score from 1 to 5, where 1 is extremely passive and 5 is extremely aggressive. A score of 3 indicated neither trait. Suppose that the probability distribution of x is as follows. Determine whether or not the table satisfies a probability distribution. If yes, find the mean (Expected value), standard deviation and variance for the probability distribution table.

x	$P(x)$				
1	0.16				
2	0.22				
3	0.28				
4	0.20				
5	0.14				

Problem 3.) Calculate the mean, variance and standard deviation of weights (in pounds) of all U.S. presidents since 1952.

173 175 200 173 160 185 195 230 190 180

(a) Find the mean, median, mode, and standard deviation for these data.

(b) Give the five-number summary of weights of all U.S. Presidents since 1952. (Optional)

(c) Do the data have any outliers? Justify why or why not by showing your work. (Optional)

(d) Make a box-and-whiskers plot for the data. (Optional)

Problem 4.) The table shows the number (in thousands) of earned degrees, by level and gender, conferred in the United States in a recent year.

		Gender		
		Male	Female	Total
Level of degree	Associate's	361	581	
	Bachelor's	734	982	
	Master's	292	439	
	Doctoral	80	84	
	Total			

- a) If a person is selected at random, find the probability that the person earned a master's degree or is a male.
- b) If a person is selected at random, find the probability that the person earned a doctorate given that the person is a female.
- c) If a person is selected at random, find the probability that the person does not earn an associate degree.

Problem 5.) A survey of U.S. adults found that 62% of women believe that there is a link between playing violent video games and teens exhibiting violent behavior. You randomly select four U.S. women and ask them whether they believe that there is a link between playing violent video games and teens exhibiting violent behavior.

a.) Find the probability that exactly one of them respond yes.

b.) Find the probability that at least two of them respond yes.

Problem 6.) The following frequency distribution table represents ages of the residents of Medicine Lake, Montana, in 2010. Find the mean, standard deviation and variance for the frequency distribution table.

Age	Frequency					
0 – 9	30					
10 – 19	28					
20 – 29	17					
30 – 39	22					
40 – 49	23					
50 – 59	46					
60 – 69	37					
70 – 79	18					
80 – 89	4					

a) Find the class width, class midpoints, class boundaries, the relative frequency and the cumulative frequency.

b) Construct a histogram using the class boundaries

Problem 7.)

A researcher claims that the mean annual cost of raising a child (age 2 and under) by husband-wife families in the U.S. is \$13,960. In a random sample of husband-wife families in the U.S., the mean annual cost of raising a child (age 2 and under) is \$13,725. The sample consists of 500 children. Assume the population standard deviation is \$2345. Use the 0.10 level of significance.

Problem 8.) A survey indicates that for each trip to a supermarket, a shopper spends an average of 45 minutes with a standard deviation of 12 minutes in the store. The lengths of time spent in the store are normally distributed and are represented by the variable x . A shopper enters the store. Find the probability that the shopper will be in the store less than 54 minutes.

Problem 9.) The lengths of lumber a machine cuts are normally distributed, with a mean of 96 inches and a standard deviation of 0.5 inch. You randomly select 40 boards. Find the probability that their mean length is

a) Greater than 96.25 inches. (Draw the bell curve)

b) Between 95.85 inches and 96.25 inches (Draw the bell curve)

Problem 10.) A college admissions director wishes to estimate the mean age of all students currently enrolled. In a random sample of 30 students, the mean age is found to be 22.9 years. From past studies, the standard deviation is known to be 1.5 years, and the population is normally distributed. Construct a Find the 90% confidence interval of the population mean age.

Problem 11.) A researcher conducts a study to determine whether there is a linear relationship between a person's height (in inches) and pulse rate (in beats per minute). The data are shown in the table below.

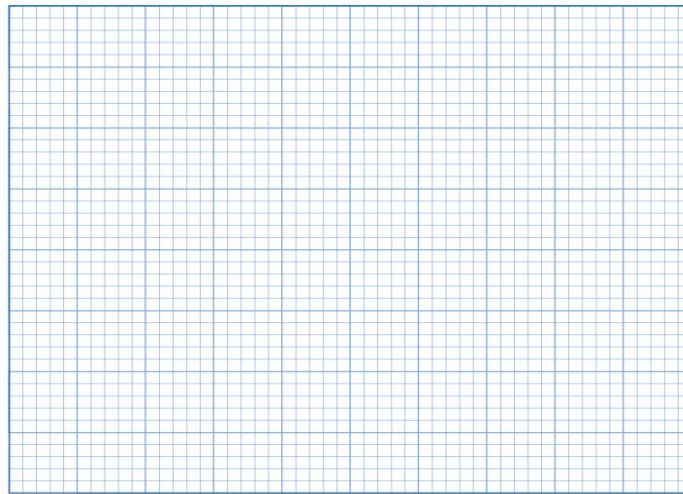
Heights, x	68	72	65	70	62	75	78	64	68
Pulse rate, y	90	85	88	100	105	98	70	65	72

x	y	xy	x^2	y^2
68	90	6120	4624	8100
72	85	6120	5184	7225
65	88	5720	4225	7744
70	100	7000	4900	10000
62	105	6510	3844	11025
75	98	7350	5625	9604
78	70	5460	6084	4900
64	65	4160	4096	4225
68	72	4896	4624	5184
$\sum x = 622$	$\sum y = 773$	$\sum xy = 53336$	$\sum x^2 = 43206$	$\sum y^2 = 68007$

(a) Find the correlation coefficient (r).

(b) Find the regression equation.

(c) Plot this regression line equation on the same graph as the scatterplot.



Problem 12.) An insurance agent says that the mean cost of insuring a two-year-old sedan (in good condition) is less than \$1200. A random sample of 7 similar insurance quotes has a mean cost of \$1125 and a standard deviation of \$55. Is there enough evidence to support the agent's claim at $\alpha = 0.10$. Assume the population is normally distributed.