

Stats 2B03 Test #1 (Version 1)
October 21st, 2016

Name: _____
 (Last Name) (First Name)

Student Number: _____

This test consists of 20 multiple choice questions worth 1 mark each (no part marks), and 1 question worth 1 mark (no part marks) on proper computer card filling. Questions must be answered on the COMPUTER CARD with an HB PENCIL. Marks will not be deducted for wrong answers (i.e., there is no penalty for guessing). You are responsible for ensuring that your copy of the test is complete. Bring any discrepancy to the attention of the invigilator. Only the McMaster standard calculator Casio fx-991 is allowed.

1. Suppose that we want to produce a 95% confidence interval for a population mean based on a sample of size 45, with σ unknown, but the population is very skewed. Which of the following statements is true?
 - (a) The confidence interval can be calculated only using the t -distribution.
 - (b) The confidence interval can be calculated only using the normal distribution.
 - (c) Because the population is skewed, one cannot use the normal or t -distribution to produce a confidence interval.
 - (d) Both the normal and t -distributions can be used to produce a confidence interval.
 - (e) If one constructed a normal probability plot of the population then the points would fall close to a straight line.

2. In survey of nursing students pursuing a master's degree, 75% percent stated that they expect to be promoted to a higher position within one month after receiving the degree. If this percentage holds for the entire population, find, for a sample of 10, the probability that the number expecting a promotion within a month after receiving the degree is 7 or 8.
 - (a) .3909 (b) .4614 (c) .2503 (d) .0083 (e) .5318

3. A study was done to examine the effectiveness of cardiopulmonary resuscitation (CPR) training in people over 55 years old. They compared skill retention rates of subjects in this age group who completed a course in traditional CPR instruction with those who received chest-compression only cardiopulmonary resuscitation (CC-CPR). The table below shows the skill retention numbers in regard to overall competence as assessed by video ratings done by two video evaluators.

Rated Overall Competent	CPR	CC-CPR
Yes	12	8
No	17	5

If a person is randomly selected from the above group, find the probability that they were rated competent or were enrolled in CC-CPR.

- (a) .6154 (b) .4836 (c) .5952 (d) .7857 (e) .1905

4. Consider the data set summarized in the Minitab Output below.
Stem-and-Leaf Display: C15

Stem-and-leaf of C15 N = 12
Leaf Unit = 1.0

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2    1    89
5    2    457
( 2 ) 3    26
5    4    378
2    5
2    6    19

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Find the first quartile Q_1 .

- (a) 24.5 (b) 24 (c) 25 (d) 26 (e) 25.25

5. Consider the following Minitab output which is a summary of the weights (in pounds) of a randomly selected group of people.

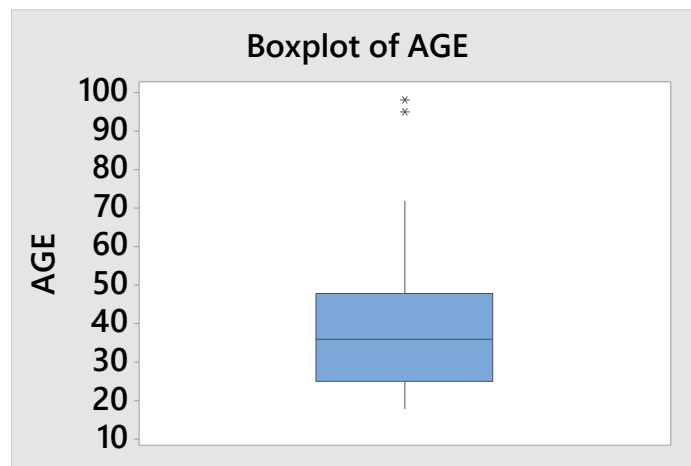
Tally for Discrete Variables: Recoded WEIGHT

Recoded WEIGHT	Count	Percent	CumPct
090-119	?	?	18.82
120-149	?	?	52.94
150-179	?	?	81.18
180-209	?	?	96.47
210-239	?	?	100.00
N=	85		

How many people in the data set weighed between 150 and 179 pounds?

- (a) 70 (b) 81 (c) 24 (d) 28 (e) 13

6. The below graph is a modified boxplot of the ages of a randomly selected group of 87 people.



Approximately how many people in the data set were less than 48 years of age?

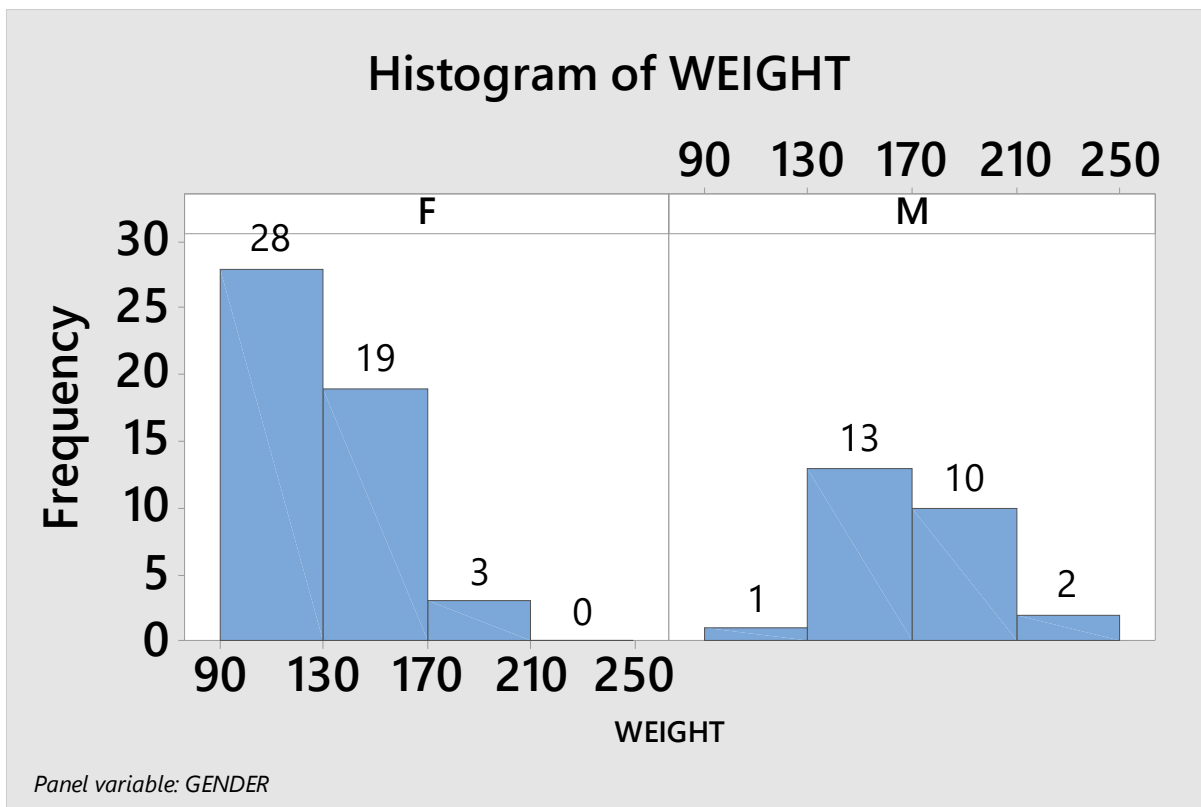
- (a) 75 (b) 65 (c) 25 (d) 22 (e) 44

10. Suppose that the random variable X has the following probability distribution,

x	$P(x)$
0	$\frac{1}{10}$
1	$\frac{2}{5}$
2	?

Find the standard deviation of X .

- (a) .7483 (b) .6633 (c) .4400 (d) .2400 (e) .4899
11. Consider the data set that is summarized in the following histogram of weight by gender that was produced by Minitab.

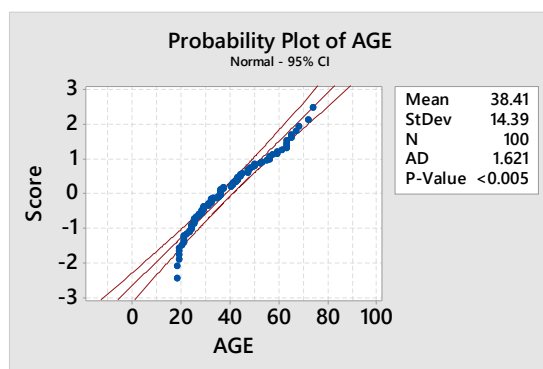


Estimate the overall average weight for the entire data set.

- (a) 150.00 (b) 143.68 (c) 147.87 (d) 140.36 (e) 145.00

12. Arsenic blood concentrations in healthy individuals are normally distributed with mean 3.2 $\mu\text{g/dl}$ and standard deviation 1.5 $\mu\text{g/dl}$. 90% of healthy individuals have an arsenic blood concentration greater than what value?
- (a) 5.66 (b) .74 (c) 1.63 (d) 5.12 (e) 1.28
13. The blood cholesterol levels of men aged 55 to 64 are normal with mean 222 mg/dl and standard deviation 37 mg/dl. What percentage of these men have high cholesterol (levels above 240 mg/dl)?
- (a) 10.15% (b) 68.79% (c) .15% (d) 31.21% (e) 51.35%
14. It is commonly believed that 45% of the population has type O blood. In a random sample of 100 people, 58 of them have Type O blood. Is this an unusual result that would suggest that the percentage of people with Type O blood is greater than 45%?
- (a) Yes, because 58 is greater than 54.95.
(b) No, because 58 is less than 59.93.
(c) Yes, because the probability of 58 people out of 100 having Type O blood is equal to .0027, which is less than .05.
(d) Yes, because 58 is a lot more than expected.
(e) No, because 58 is not much more than expected.
15. For babies born at full term (37 to 39 completed weeks of gestation), the mean birth weight is 3350 g with standard deviation 440 g. In a sample of 40 babies born at full term, find the probability that the average birth weight is between 3300 g and 3450 g.
- (a) .6893 (b) .1348 (c) .1609 (d) .3547 (e) .5591
16. In one of the experiments of Mendel's theory of genetics, peas with long stems were crossed with peas having short stems. Results consisted of 787 peas with long stems and 277 peas with short stems. Find a 99% confidence interval estimate of the proportion of offspring having short stems.
- (a) (.229, .292) (b) (.234, .287) (c) (.226, .295) (d) (.308, .396) (e) (.319, .385)

17. Suppose that we want to estimate the proportion of students in this class who study for more than 2 hours per day. And suppose that each student in this class uses their personalized class data set to produce a 98% confidence interval for this proportion. If there are 550 students who produce such a confidence interval, and the true (population) proportion of students in this class who study for more than 2 hours per day is equal to .67, which of the following statements is true?
- (a) All of the confidence intervals will contain the value 2.
 - (b) Approximately 28 students will produce a confidence interval that does not contain the value .67
 - (c) Approximately 545 students will produce a confidence interval that contains the value .67
 - (d) Approximately 11 students will produce a confidence interval that does not contain the value .67.
 - (e) Approximately 539 students will produce a confidence interval that contains the value 2.
18. Consider the following normal probability plot for the ages of a randomly selected group of people.



Is it reasonable to assume that the ages come from a population which follows a normal distribution?

- (a) Yes, because the points are roughly bell-shaped, and the p -value is less than .05.
 - (b) No, because the points do not fall close to a straight line, and the p -value is less than .05.
 - (c) Yes, because the p -value is less than .05.
 - (d) Yes, because the sample size is bigger than 30.
 - (e) Yes, because the standard deviation is known (and is equal to 14.39).
19. In order to correctly diagnose the disorder of hydrocephalus, a pediatrician measures the head circumference (in cm) of a random sample of 10 two-year-olds, and produces the following confidence interval for the mean head circumference: (38.563, 41.437). The sample standard deviation was 2.479. What is the level of confidence? (Assume that the population is normally distributed.)
- (a) 93% (b) 97% (c) 99% (d) 95% (e) 90%

20. The number of pounds gained during pregnancy is a normal random variable with mean 30.23 pounds and standard deviation 13.84 pounds. Using the empirical rule, the weight gained during pregnancy for 81.5% of women is between what two values?

- (a) 2.55 and 57.91 lbs (b) 2.55 and 71.75 lbs (c) 16.39 and 71.75 lbs
 (d) 16.39 and 57.91 lbs (e) 16.39 and 44.07 lbs

21. Correctly fill out the bubbles corresponding to all 9 digits of your student number, as well as the version number of your test in the correct places on the computer card.

Note: You are writing **Version 1**.

Hint:

The image shows a McMaster University Examination Answer Sheet. At the top, there is a header section with fields for Student Number (008816132), Name (Sample Correct), Date, Sheet #, Signature (Correct Sample), Course, Section, and Instructor's Name. The McMaster University logo is on the right. Below the header is a large grid of bubbles for the Student Number (008816132) and a Version column. Handwritten notes indicate to fill in 9 bubbles (one per column) and to put the version number (1) in the version column. To the right of the grid are instructions: 'Use all 9 digits of your student number, including leading zeros (if any)', 'Ignore this part MARKING DIRECTIONS', and 'Read these directions'. A list of marking directions includes: 'Use HB black lead pencil only.', 'Do not use ink or ballpoint pens.', 'Make heavy black marks that fill the circle completely.', 'Erase cleanly any answer you wish to change.', and 'Make no stray marks on the answer sheet.' Examples of correct and incorrect marking are shown. At the bottom, there are 25 rows of bubbles for answers, labeled 1 through 25. The left margin says 'CLASSROOM ANSWER SHEET' and 'SIDE 1'. The right margin has 'McMaster University', 'EXAMINATION ANSWER SHEET', 'Mark Refuge® EM-350786-1-05432', 'E008', and '© 2010'.

Answers (Version 1):

1. a 2. e 3. c 4. a 5. c 6. b 7. b 8. d 9. c 10. b
11. b 12. e 13. d 14. a 15. a 16. c 17. d 18. b 19. e 20. d