

Name: _____ Student Number: _____
(Last Name) (First Name)

Stats 2B03
Sample Test #1 (Version 3)
(Covers Chapters 1-6)

Day Class

Duration: 75 Minutes

Instructors: All Sections

Maximum Mark: 21

This test paper consists of 20 multiple choice questions plus one question on computer card filling. Marks will NOT be deducted for wrong answers (i.e., there is no penalty for guessing). QUESTIONS MUST BE ANSWERED ON THE COMPUTER CARD with an HB PENCIL. Answer all questions. You are responsible for ensuring that your copy of this paper is complete. Bring any discrepancy to the attention of your invigilator. Only the McMaster standard Calculator Casio fx-991 is allowed. The formula sheet at the front of this manual will be provided with the tests and exam.

1. Consider the data set that is summarized in the Minitab output below.

Tally for Discrete Variables: IQ Grouping

IQ Grouping	Count	Percent	CumPct
080-089	?	?	1.12
090-099	?	?	11.24
100-109	?	?	46.07
110-119	?	?	77.53
120-129	?	?	97.75
130-139	?	?	100.00
N=	89		

How many people in the above data set had an IQ between 100 and 119?

(a) 66 (b) 31 (c) 59 (d) 28 (e) 44

2. A large population of the fruit fly *Drosophila melanogaster* is maintained in the lab. In the population, 30% of the individuals are black because of a mutation, while 70% of the individuals have the normal gray body color. Suppose that 10 such flies are randomly chosen from the population and 8 of them are black. Is this an unusual result that would suggest that perhaps the percentage of black fruit flies in the population is greater than 30%?
- (a) Yes, because .0014467 is less than .05.
(b) Yes, because 8 is a lot more than expected.
(c) Yes, because 8 is greater than 4.45.
(d) Yes, because 8 is greater than 5.90.
(e) Yes, because 8 is greater than 7.35.

3. A statistics class has 2 sections. The final marks are summarized in the Minitab output below. If a person is randomly selected from the below data, find the probability that they were in section 1 (C01) and got a mark of at least 72.

Descriptive Statistics: Marks

Variable	Section	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median
Marks	C01	230	0	70.70	1.12	16.98	26.00	59.00	72.00
	C02	373	0	68.861	0.855	16.509	25.00	57.00	69.00

Variable	Section	Q3	Maximum
Marks	C01	85.00	100.00
	C02	81.00	100.00

(a) .8814 (b) .5000 (c) .3814 (d) .3083 (e) .1907

4. Consider the following Minitab output, which summarizes weights from the databank data set, by gender.

Variable	GENDER	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median
WEIGHT	F	50	0	129.68	2.86	20.21	99.00	112.00	125.00
	M	50	0	170.38	3.30	23.37	128.00	152.00	167.00

Variable	GENDER	Q3	Maximum
WEIGHT	F	143.00	179.00
	M	187.25	234.00

Fill in the blank. Approximately _____ (how many?) females in the databank data set weigh at least 112 pounds?

(a) 13 (b) 38 (c) 75 (d) 25 (e) 43

5. Consider the following data set,

64, 71, 35, 73, 32, 62, 56, 68, 81

Find the adjacent values a_1 and a_2 .

(a) 35 and 81 (b) 32 and 81 (c) 56 and 81 (d) 56 and 73 (e) 35 and 73

6. A large population of the fruit fly *Drosophila melanogaster* is maintained in the lab. In the population, 30% of the individuals are black because of a mutation, while 70% of the individuals have the normal gray body color. Suppose that two such flies are randomly chosen from the population. Find the probability that both flies are the same colour.

(a) .0441 (b) .2100 (c) .5800 (d) .4200 (e) .7900

7. Dandelions are studied for their effects on crop production and lawn growth. In one region, the mean number of dandelions per square meter was found to be 7.0. Assuming that the number of dandelions per square meter follows a Poisson distribution, find the probability of exactly two dandelions in an area of one square meter.

(a) .0223 (b) .0034 (c) .0584 (d) .9927 (e) .0073

8. In populations of the snail *Cepaea*, the shells of some individuals have dark bands, while other individuals have unbanded shells. Suppose that a biologist is planning a study to estimate the percentage of banded individuals in a certain natural population, and that she wants to estimate the percentage - which she anticipates will be in the neighbourhood of 70% - with a 95% confidence interval and margin of error of 4 percentage points. How many snails should she plan to collect?

(a) 356 (b) 2017 (c) 618 (d) 505 (e) 258

9. Consider the Minitab Output below which is a cross-tabulation table of the variables exercise (0 = none, 1 = light, 2 = moderate, 3 = heavy) and smoking status (0 = does not smoke, 1 = smokes less than one pack per day, 2 = smokes one or more packs per day) from the Databank data set. If a person is selected at random from the group of people summarized in the below output, find the probability that their exercise level is moderate or heavy, or that they do not smoke.

Tabulated statistics: EXERCISE, SMOKING STATUS

Rows: EXERCISE Columns: SMOKING STATUS

	0	1	2	All
0	17	14	7	38
1	15	18	5	38
2	8	3	2	13
3	7	2	2	11
All	47	37	16	100

Cell Contents: Count

(a) .15 (b) .56 (c) .71 (d) .32 (e) .63

10. The amount of growth, in a 15-day period, for a population of sunflower plants was found to follow a normal distribution with mean 3.18 cm and standard deviation 0.53 cm. What percentage of sunflower plants grow between 2.97 and 3.30 cm in a 15-day period?

(a) 75.36% (b) 31.92% (c) 24.64% (d) 6.44% (e) 41.64%

-
- Histogram of WEIGHT**
- Frequency
- WEIGHT
- Panel variable: GENDER
- | Gender | Weight Range | Frequency |
|--------|--------------|-----------|
| F | 90 - 110 | 8 |
| | 110 - 130 | 20 |
| | 130 - 150 | 13 |
| | 150 - 170 | 6 |
| | 170 - 190 | 3 |
| M | 110 - 130 | 1 |
| | 130 - 150 | 9 |
| | 150 - 170 | 17 |
| | 170 - 190 | 12 |
| | 190 - 210 | 8 |
| | 210 - 230 | 2 |
| | 230 - 250 | 1 |

(a) .7300 (b) .1154 (c) .0600 (d) .0300 (e) .2115

- (a) Stem-and-leaf of tpounds N = 800 Leaf Unit = 0.10
- | | Stem | Leaf |
|-------|------|---|
| | 1 | 0 7 |
| | 7 | 1 001246 |
| | 12 | 2 00235 |
| | 20 | 3 01334588 |
| | 41 | 4 001223355566667888999 |
| | 108 | 5 00011111222233333333344455555566667777888888888888888888899999+ |
| | 268 | 6 0000000000000111111111111111222222223333333333333444444444455+ |
| (284) | 7 | 00000000000000000000000000000000000001111111111111111111+ |
| 238 | 8 | 00000000000000000000000000000111111111111111111112222222333333+ |
| 73 | 9 | 0000000000000001111111111222222222333333445555666688888 |
| 17 | 10 | 00000011123333345 |

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(b) Stem-and-leaf of tpounds N = 800 Leaf Unit = 0.10

[illegible]

(c) Stem-and-leaf of tpounds N = 800 Leaf Unit = 0.10

1	0	7
7	1	001246
12	2	00235
20	3	0133458
41	4	001223355566667888999
108	5	000111112222333333333344455555556666777788888888888888888888999999+
278	6	0000000000000111111111111111222222233333333333333444444444455+
(284)	7	0011111111111111111111+
238	8	001111111111111111111222222333333+
73	9	000000000000000111111111111111112222222222333333445555666688888
17	10	00000011123333345

(d) Stem-and-leaf of tpounds N = 800 Leaf Unit = 0.10

1	0	7
7	1	001246
12	2	00235
20	3	01334588
41	4	001223355566667888999
108	5	00011111222233333333344455555566667777888888888888888888999999+
268	6	000000000000011111111111111122222222333333333333344444444455+
(284)	7	001111111111111111111+
248	8	00111111111111111112222222333333+
73	9	0000000000000011111111111222222222333333445555666688888
17	10	00000011123333345

(e) Stem-and-leaf of tpounds N = 800 Leaf Unit = 0.10

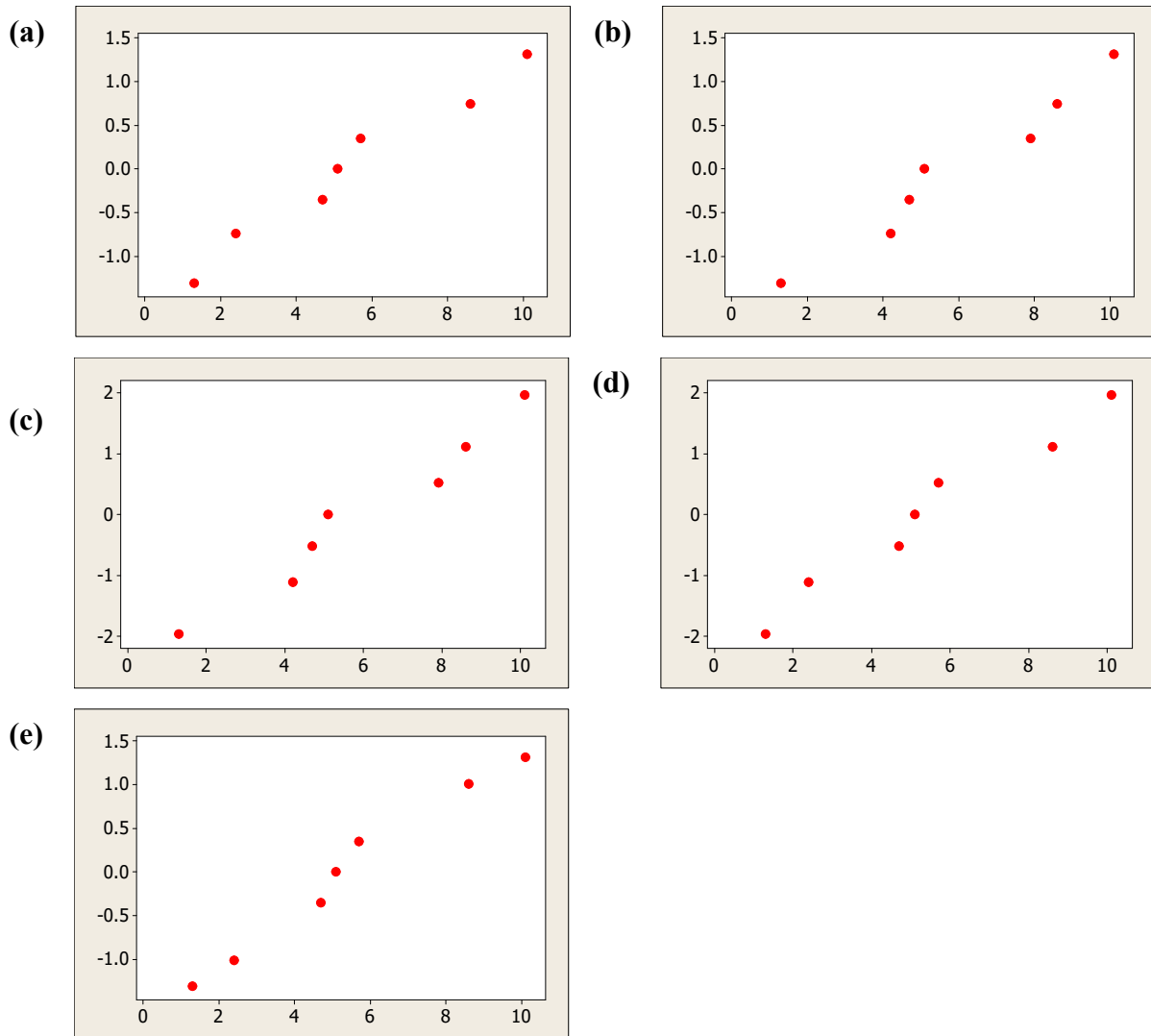
[illegible]

13. The amount of growth, in a 15-day period, for a population of sunflower plants was found to follow a normal distribution with mean 3.18 cm and standard deviation 0.53 cm. Fill in the blank. 30% of sunflower plants grow more than _____ cm in a 15-day period.

- (a) 3.25 (b) 3.19 (c) 2.90 (d) 3.46 (e) 3.37

14. Which of the plots below is a correct normal probability plot for the following data?

1.3, 5.7, 2.4, 8.6, 10.1, 4.7, 5.1



15. As part of a study of the development of the thymus gland, researchers weighed the glands of five chick embryos after 14 days of incubation. The thymus weights (in mg) were as follows:

29.6, 21.5, 28.0, 34.6, 44.9

Find a 90% confidence interval for the mean weight of all chick embryos after 14 days of incubation. Assume that the population is normally distributed.

- (a) (13.747, 49.693) (b) (23.398, 40.042) (c) (20.881, 42.559)
(d) (25.299, 38.141) (e) (24.069, 39.371)

16. Weights of newborn babies in the United States are normally distributed with a mean of 3420 g and a standard deviation of 495 g. If 49 newborn babies are randomly selected, find the probability that their mean weight is greater than 3300 g.

- (a) .4052 (b) .5948 (c) .0446 (d) .5119 (e) .9554

17. A researcher interested in estimating a population proportion takes a sample from the population, and based on this sample produces a 90%, 95%, and 99% confidence interval. The three confidence intervals in SCRAMBLED order are as follows:

(i) (.229, .488) (ii) (.250, .467) (iii) (.189, .528)

What are the confidence levels of each of the above confidence intervals?

- (a) (i) 99% (ii) 95% (iii) 90%
(b) (i) 99% (ii) 90% (iii) 95%
(c) (i) 90% (ii) 99% (iii) 95%
(d) (i) 95% (ii) 99% (iii) 90%
(e) (i) 95% (ii) 90% (iii) 99%

18. Let z be a standard normal random variable. Find z_1 such that $P(-2.3 < z < z_1) = .1046$.

- (a) -1.2 (b) 1.2 (c) -.97 (d) .97 (e) 1.34

19. Three people are selected at random from a group of 8 men and 11 women, to participate in an exercise study. Find the probability that all three people are the same gender.

- (a) .1967 (b) .2281 (c) .0098 (d) .2687 (e) .2015

- 20.** Suppose that a student in this class uses their personalized class data set to find a 95% confidence interval for the proportion of people in this class who study more than 2 hours per day, and obtain the following interval: $(.287, .351)$. Which of the following statements is true?
- (a)** The proportion of students in this class who study more than 2 hours per day is between 28.7% and 35.1%.
 - (b)** The margin of error is 5%.
 - (c)** The proportion of students in this class who study more than 2 hours per day might not be between 28.7% and 35.1%.
 - (d)** The margin of error is 6.4%
 - (e)** At least 28.7% of students in this class study more than 2 hours per day.
- 21.** Correctly fill out the bubbles corresponding to your student number and the version number of your test in the correct places on the computer card.

Answers (Sample Test #1 Version 3):

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