

Carson-Newman University MATH 201 Test 1, Fall 2018

Directions:

- You may use a stand-alone calculator, but electronic communication is prohibited. No other sources of information are allowed.
- To receive full credit, you must show all relevant work to justify your answer on the test paper. Write down your calculator commands for statistical calculations.
- Clearly identify your final answer, correct to at least 3 significant digits.
- Use notation as described in class.

Honor Pledge: I pledge that I will neither give nor receive unauthorized help on this test from any person, technology, or other resource, and that I will abide by the honor code of Carson-Newman University.

Signed: _____

1. This stem plot shows the number of pounds gained during pregnancy for a sample of $n = 64$ women.

stem	leaves
0	69
1	01335567779
2	00123444556677888899
3	0001222334455567789
4	00135568
5	124

- (a) If $\sum x = 1858$, find \bar{x} .
Answer: $1858/64 = 29.03$ pounds per woman
- (b) Find the mode.
Answer: 28
- (c) Find the range.
Answer: $54 - 6 = 48$
2. Americans drink 6.8 billion gallons of milk each year. That is _____ gallons per-capita.
Answer: $6800/325 = 20.9$
3. Our daughter is named "Page". The table below shows the distribution of ages of all females by that name living in the U.S. in 2014. The standard deviation is 12.3 years.
- (a) mean
Answer: $2410831/136142 = 17.7$
- (b) median
Answer: 16



- (c) mode
Answer: 11
- (d) range
Answer: 102
- (e) inter-quartile range
Answer: $Q_3 - Q_1 = 22 - 9 = 13$
- (f) variance
Answer: $12.3^2 = 151$
- (g) Find the z-score of a 40 year old.
Answer: $\frac{40-17.7}{12.3} = 1.81$
- (h) 10th percentile age
Answer: 4
- (i) Percentile of someone 10 years old.
Answer: 29th
- (j) What proportion are under 20 years old?
Answer: $CDF(19) = .635$
- (k) What proportion are at least 20 years old?
Answer: $1 - CDF(19) = .365$

4. The Apgar Score is a measure of a newborn's health in the range from 0-10. Here are the Apgar scores for a sample of infants taken five minutes after birth.

Apgar	frequency	relative	cumulative
0	0	—	—
1	2	—	—
2	7	—	—
3	12	—	—
4	23	—	—
5	37	—	—
6	64	—	.330
7	92	—	.539
8	118	—	—
9	—	.161	.968
10	—	—	—
	n	1	

- (a) Fill out the missing entries of the table. Do not worry about the ones blackened out.

Answer: Solve $.209 = \frac{92}{n}$ to get $n = 440$.

Apgar	frequency	relative	cumulative
0	0	.000	.000
1	2	.005	.005
2	7	.016	.021
3	12	.027	.048
4	23	.052	.100
5	37	.084	.184
6	64	.145	.329
7	92	.209	.538
8	118	.268	.806
9	71	.161	.967
10	14	.032	1
	440	1	

(b) Is the distribution left or right skewed?

Answer: left

(c) Use your calculator to find the standard deviation.

Answer: 1varstats L1,L2 gives $s = 1.78$

5. The mother of a newborn baby is keeping track of how many diapers she uses each week. Make up a list of integers that satisfies these criteria:

- sample size = 6
- each number is distinct (no repeats)
- mean = 75
- median = 71
- range = 20

Answer: one possible answer is: 68, 69, 70, 72, 83, 88

6. Is the random variable continuous or discrete?

(a) Number of disposable diapers used by a baby in a week.

Answer: discrete

(b) Pounds gained by a mother during pregnancy.

Answer: continuous

(c) Marital status of a new mother.

Answer: discrete

7. In 2007, it cost \$9 million to sequence a human genome. Now in 2018, the cost is only \$700. On average (use the geometric mean), the cost has decreased _____ percent annually.

Answer: $(700/9,000,000)^{(1/11)} - 1 = 57.7$

8. Here are infant mortality rates (deaths per 1000 births) in the U.S. broken down by race.

race	percent of births	mortality rate
Caucasian	52	5.1
African-American	19	11.5
Hispanic	22	5.4
Asian	7	3.6

Find the nationwide weighted average mortality rate.

Answer: $\bar{x} = \frac{52(5.1)+19(11.5)+22(5.4)+7(3.6)}{100} = 6.28$

9. A church nursery needs to be well supplied with wet wipes. Here is the five-number summary of the number of wet wipes used per month.

(184, 242, 275, 293, 327)

(a) Sketch a boxplot.

(b) If $s = 34.9$, and the z-score of Q_3 is 0.63, then find the mean.

Answer: solve $.63 = \frac{293 - \bar{x}}{34.9}$ to get $\bar{x} = 271$

10. Alice and Bertha are two infants whose mothers keep careful records about nap lengths. They both have a mean of 90 minutes, but Alice's standard deviation is 15 minutes, while Bertha's is 40 min. Referencing those statistics, write a short paragraph to contrast the babies' nap schedules.

Answer: Since Alice's standard deviation is lower, her nap length is more predictable. When Alice

begins a nap, she is usually asleep for close to 90 minutes. However, Bertha might sleep for only a little while (often less than an hour), or for a very long time. A higher standard deviation means her sleep pattern is irregular. Alice's mom can plan her day better, because the nap times won't deviate too much.