

University of North Georgia
Quantitative Skills and Reasoning
Exam #1 Spring 2019 – M. Goodroe

Name: Key

Directions: Answer each question completely on the exam. Seventy-five percent of the total points on a question will be awarded to your explanation and twenty-five percent to the correct answer. Each question is worth four points.

1) $\emptyset \subseteq$ any set S True or False? Explain for credit.

① By definition of subset: $A \subseteq B$ means all elements in A are in B

② As a consequence of ①, $C \not\subseteq D$ means there is something in C that is not in D

③ $n(\emptyset) = 0$ By definition

So, ④ $\emptyset \subseteq S$

The next three questions refer to the YouTube video *Excel 2013 Statistical Analysis #01 – Basics Tutorial*.

2) What is the intersection of a column and a row called in Excel?

Cell

3) How can we tell if data entered into cell in Excel is text or numerical? Be specific.

- text is on the left.
- numerical data is on the right.

4) What is the difference between absolute and relative cell reference in Excel?

- absolute reference: when a cell reference is "locked" with $\$$ in a formula and will not change.
- relative reference: when a cell reference changes in a formula and is not locked.

5) Consider the claim that : $T = \{ac, ae, ag, ce, cg, ci, \dots\}$ is well defined! Assuming the claim is true, state the next three members of the T .

$eg, ei, ek, \dots\}$

6) Given the below chart: A.) What is the Sample Space and B.) What is that a randomly selected person has been widowed?

	Married	Widowed	Divorced/Separated	Never Married
Females	12,279	104	2,328	20,449
Males	9,740	36	1,621	24,655

$$A.) = (12,279 + 104 + 2,328 + 20,449) + (9,740 + 36 + 1,621 + 24,655)$$

$$= 35,160 + 36,052$$

$$= 71,212$$

$$B.) = (104 + 36) \div 71,212$$

$$= 140 \div 71,212$$

$$= 0.001966\dots$$

$$\approx 0.196\%$$

7) If the price of iPhone XR is raised by 17% and then decreased by 17%, then the new price will be the same as the original price. True or False Support your result for credit!

Let iPhone = \$750.00

$$\textcircled{1} \$750.00 + \$750.00 \times 0.17 = \$877.50$$

$$\textcircled{2} \$877.50 - \$877.50 \times 0.17 = \$728.33$$

$$\textcircled{3} \$877.50 \neq \$728.33$$

8) $\emptyset \subset \{\}$ True or False Explain for credit.

$$\textcircled{1} \emptyset = \{\}$$

$\textcircled{2}$ By definition of Proper subset,

• $\emptyset \subseteq \{\}$ a subset of itself true

• $\emptyset \neq \{\}$ not equal to itself false

9) Define Sample Space.

The set of all outcomes.

- 10) Four children are born to a family and we note the birth order. A.) how many possibilities are in the sample space of this "experiment" and B.) What is the probability of having more girls born than boys? Drawing a tree diagram to show the possibilities may be helpful. Birth order = {1st, 2nd, 3rd, 4th}

A.) $n(S) = 4, 2^k = 2^4 = 16$ subsets (possibilities)

B.) $P(gggg, gggg, gggg, gggg, gggg)$

$$= \frac{5}{16}$$

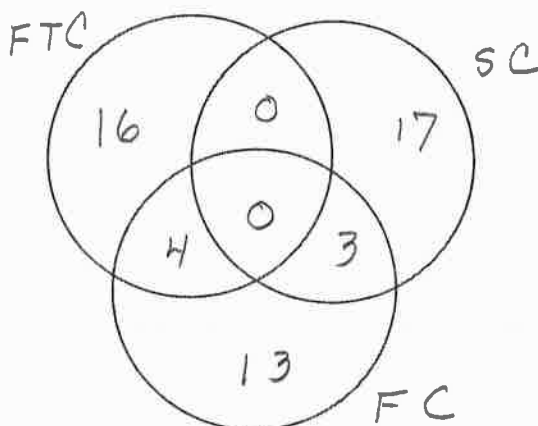
$$= 0.3125$$

$$= 31.25\%$$

- 11) Construct a frequency and relative frequency table for the following. Lori asked twenty-four classmates how many hours they spent doing studying during the previous week and she got the following results: 11, 11, 11, 9, 11, 11, 15, 11, 11, 8, 12, 11, 11, 12, 11, 11, 12, 11, 11, 11, 11, 12, 12, 9. $n = 24$

Hours	f	rf
11	15	$\frac{15}{24} = 0.625 = 62.5\%$
9	2	$\frac{2}{24} = 0.08\bar{3} = 8.3\bar{3}\%$
15	1	$\frac{1}{24} = 0.041\bar{6} = 4.1\bar{6}\%$
8	1	$\frac{1}{24} = 0.041\bar{6} = 4.1\bar{6}\%$
12	5	$\frac{5}{24} = 0.208\bar{3} = 20.8\bar{3}\%$

- 12) UNG-Oconee has the following clubs: Future Teachers Club, Spanish Club, and Film Club. Each club has twenty members. The Future Teachers Club and the Film Club have four members in common. The Spanish Club and the Film Club have three members in common. The Future Teachers Club and the Spanish Club have no members in common. Draw a diagram with represents the relationships between the clubs.



- 13) Using a coin and a six-sided cube, list the set of all possible outcomes.

$\{(H,1), (H,2), (H,3), (H,4), (H,5), (H,6), (T,1), (T,2), (T,3), (T,4), (T,5), (T,6)\}$

- 14) Since 2015 The University of Alabama and Clemson University has either won or played in the national championship football game! Given these facts, DaeJonte, sadly, is expecting that the University of Georgia will not win the 2019 national championship game. What *form of logic* is DaeJonte using. Explain your position.

Inductive Logic - Dae Jonte used past observations to draw a conjecture about a future event.

- 15) Use an alternative method to express the following set:

$S = \{y : y \text{ is an even counting number between 7 and 13}\}$

$= \{8, 10, 12\}$

- 16) What is the *Cardinal Number* of $S = \{\emptyset, \emptyset, \{\{\emptyset\}\}$

$n(S) = 2$

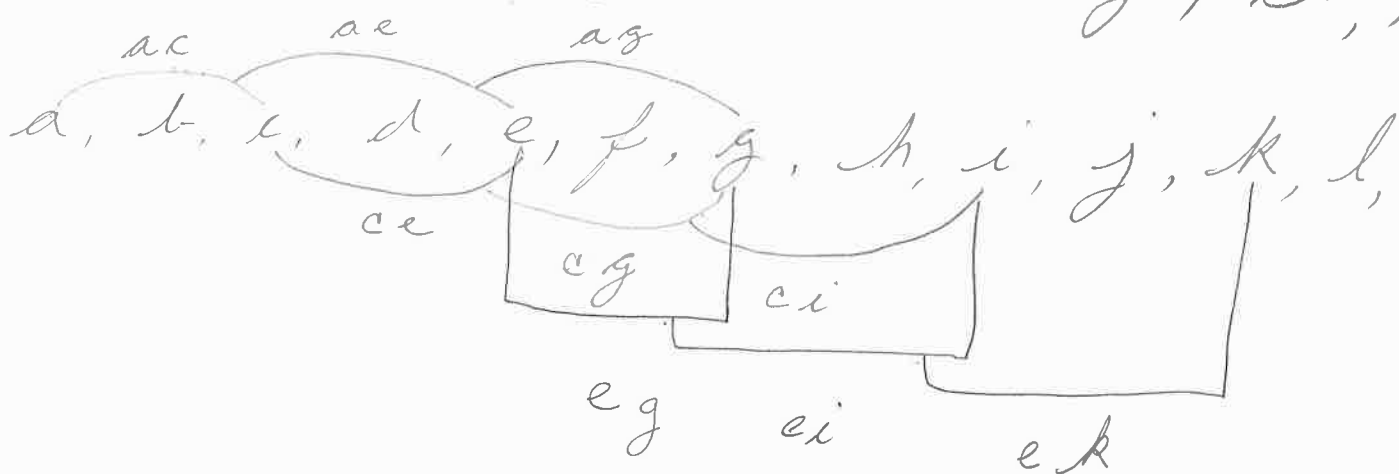
BONUS(Five Points)

What is the sum of the last digit of 7^{63} and the last digit of 2^{457} ? Use the appropriate problem-solving strategies discussed in 1.1 and the example assigned as homework to develop and show a pattern so you can show how you get your result.

7^{63}			
$7^4 = 2401$	}	(4)	$4 \div (4) = 1 \text{ r } 0 \rightarrow 1$
$7^5 = 16807$			$5 \div (4) = 1 \text{ r } 1 \rightarrow 7$
$7^6 = 117649$			$6 \div (4) = 1 \text{ r } 2 \rightarrow 9$
$7^7 = 823543$			$7 \div (4) = 1 \text{ r } 3 \rightarrow 3$
$7^8 = 5764801$			$8 \div (4) = 2 \text{ r } 0$
$63 \div (4) = 15 \text{ r } 3 \rightarrow \boxed{3}$			
			2^{457}
			$2^4 = 16$
			$2^5 = 32$
			$2^6 = 64$
			$2^7 = 128$
			$2^8 = 256$
			$20 \rightarrow 6$
			$21 \rightarrow 2$
			$22 \rightarrow 4$
			$23 \rightarrow 8$
			$20 \rightarrow 6$
			$257 \div (4) = 64 \text{ r } 1 \rightarrow \boxed{2}$
$3 + 2 = \boxed{5}$			

aaa, aab, aba, baa, abb,
bab, bba, bbb.

ac, ae, ag, ce, cg, ci, ...



$7^4 = 2401$
 $7^5 = 16807$
 $7^6 = 117649$
 $7^7 = 823543$
 $7^8 = 5764801$

$4 \div 4 = 1 \text{ r } 0 \rightarrow 1$
 $5 \div 4 = 1 \text{ r } 1 \rightarrow 7$
 $6 \div 4 = 1 \text{ r } 2 \rightarrow 9$
 $7 \div 4 = 1 \text{ r } 3 \rightarrow 3$
 $8 \div 4 = 2 \text{ r } 0 \rightarrow 1$

$7 \cdot 63 \div 4 = 15 \text{ r } 3$

3

$2^4 = 16 \text{ r } 0 \rightarrow$
 $2^5 = 32 \text{ r } 1$
 $2^6 = 64 \text{ r } 2$
 $2^7 = 128 \text{ r } 3$
 $2^8 = 256 \text{ r } 0$

$2 \cdot 457 \div 4 = 228 \text{ r } 1 \rightarrow 2$

$3 + 2 = 5$