

$$\frac{56}{56} = 100$$

**University of North Georgia**  
**Quantitative Skills and Reasoning**  
**Exam #2 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.**

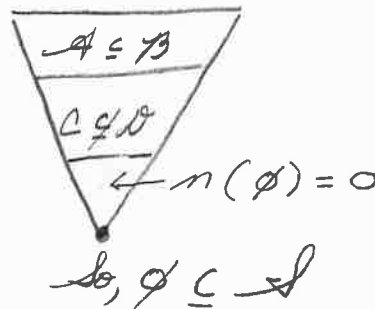
- E1 1.1 1) What is the last digit in  $3^{6500}$ ? A "brute" force approach will take hours! Understand the pattern to develop the correct result. Show all work!

$$\left. \begin{array}{l} 3^1 = \underline{3} \\ 3^2 = \underline{9} \\ 3^3 = \underline{27} \\ * 3^4 = \underline{81} \\ 3^5 = \underline{243} \\ 3^6 = \underline{729} \\ 3^7 = \underline{2187} \\ * 3^8 = \underline{6561} \\ 3^9 = \underline{19683} \\ 3^{10} = \underline{59049} \end{array} \right\} \begin{array}{l} 4 \div 4 = 1 \\ \\ \\ \\ 8 \div 4 = 2 \end{array}$$

Because  
 $6500 \div 4 = 1625$   
 Then the last digit is "1"

- E1 2.1 2)  $\emptyset \subseteq$  any set  $S$  - True or False? Explain.

True



Ex # 6  
Pg. 65

3) Is  $(A \cup B)' \equiv A' \cup B'$ ? - Construct a Venn diagram to support your answer for credit. Let  $U = \{1, 2, \dots, 10\}$

$$A = \{1, 2, 5, 7, 9\}$$

$$B = \{2, 4, 5, 7, 8\}$$

$$A' = \{3, 4, 6, 8, 10\}$$

$$B' = \{1, 3, 6, 9, 10\}$$

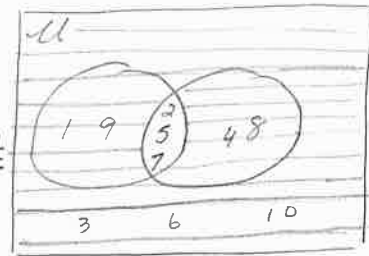
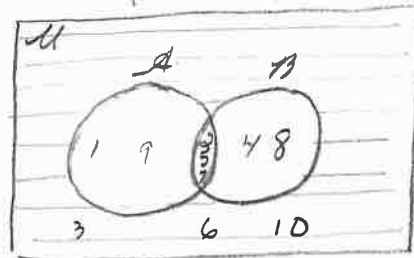
$$(A \cup B)' = \{3, 6, 10\}$$

$$A' \cup B' = \{1, 3, 4, 6, 8, 9, 10\}$$

$$(A \cup B)'$$

$$A' \cup B'$$

$$(A \cup B)' \neq A' \cup B'$$



Ex # 18  
Pg. 68

4) Let  $U = \{\text{apple, flat-screen TV, hat, satellite radio, fish, sofa, hybrid automobile, potato chips, bread, banana, hammer, pizza}\}$ ,  
Let  $M = \{x : x \text{ is human-made}\}$ , Let  $E = \{y : y \text{ is edible}\}$ , Let  $G = \{t : t \text{ grows on a plant}\}$

Find the following set:  $G \cap (M' \cap E) = \{t : t \text{ grows on a plant}\} \cap$

$$\left( \{x : x \text{ is } \underline{\text{not}} \text{ human-made}\} \cap \{y : y \text{ is edible}\} \right)$$

$$= \{\text{apple, banana}\} \cap (\{\text{apple, fish, banana}\} \cap \{\text{apple, fish, potato chips, bread, banana, pizza}\})$$

$$= \{\text{apple, banana}\} \cap \{\text{apple, fish, banana}\}$$

$$= \{\text{apple, banana}\}$$

3.1 5) Negate the following: Some little dogs are not scared of their own shadow.

No little dogs are not scared of their own shadow.

or

All little dogs are scared of their own shadow.

Ex. # 28  
pg. 95

6) Consider the following statements: *t*: The radial tires are included., *s*: The sunroof is extra., and *w*: Wi-Fi is optional. Translate the following symbolic statement in to words:  $t \rightarrow (s \vee \sim w)$ .

If the radial tires are included, then the sunroof is extra or the Wi-Fi is not optional.

Ex. # 4  
pg. 100

7) Find the truth table for the following compound statement:

$(\sim p \wedge q) \vee (p \wedge q)$ .

<i>p</i>	<i>q</i>	$\sim p$	$(\sim p \wedge q)$	$\vee$	$(p \wedge q)$
T	T	F	F	T	T
T	F	F	F	F	F
F	T	T	T	T	F
F	F	T	F	F	F

Ex. # 5  
pg. 101

8) How lines for the following statement:  $(\sim p \vee q) \wedge (\sim r)$ ?

$n = 3$  variables

$2^n = 2^3 = 8$  lines

Ex. # 1  
pg. 115

9) Assume that *p* represents a true statement, *q* a false statement, and *r* a true statement. Determine the truth value of:  $\sim(p \vee q) \rightarrow \sim p$

F T F

Ex. # 28  
pg 116

- 10) Write the "inverse" of the following sentence: *If x is an even prime number, then x is divisible by 2.*

$$p \rightarrow q \quad \sim p \rightarrow \sim q$$

*If x is not an even prime number, then is not divisible by 2.*

Ex. # 11  
pg 112

- 11) True or False:  $\sim p \rightarrow \sim q \equiv q \rightarrow p$ ? Show all work to support your conclusion.

p	q	$\sim p$	$\sim q$
T	T	F	F
T	F	F	T
F	T	T	F
F	F	T	T

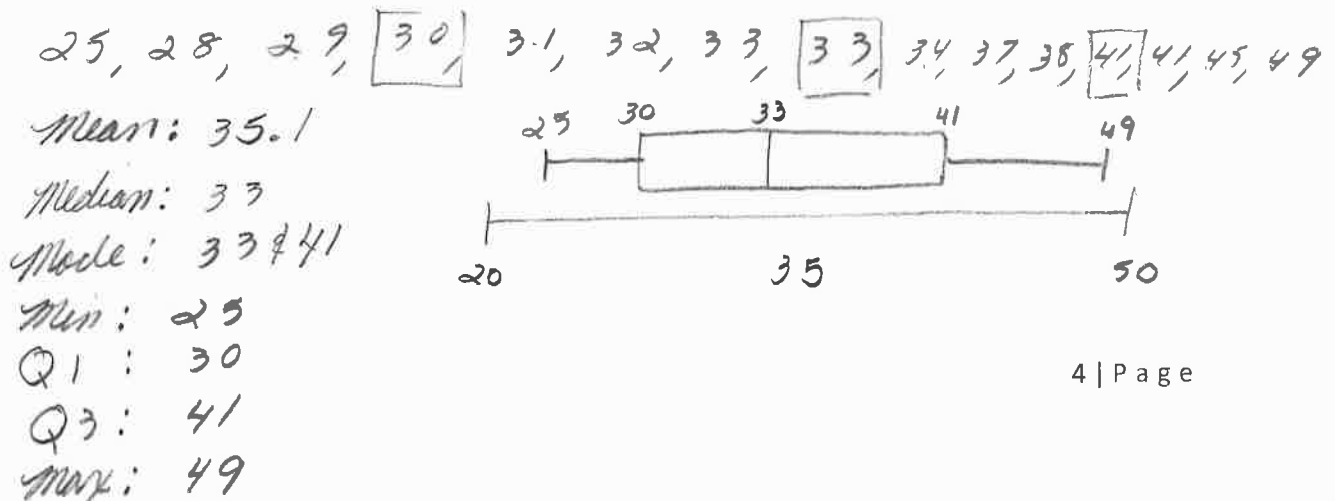
$\sim p \rightarrow \sim q$
T
T
F
T

$q \rightarrow p$
T
T
F
T

$\equiv$  yes

Ex. # 19  
pg. 744

- 12) Use the following to find the mean, median, mode, and five-number summary. Then construct a *box-and-whisker plot*.  
31, 25, 41, 33, 28, 34, 37, 41, 33, 29, 49, 32, 38, 45, 30



Ex. # 3  
Pg. 755

13) Using the following values, state the **standard deviation** and the **coefficient of variation (CV)**. 5, 7, 9, 4, 6, 8, 7, 10

X	$x - \bar{x}$	$(x - \bar{x})^2$
5	-2	4
7	0	0
9	2	4
4	-3	9
6	-1	1
8	1	1
7	0	0
10	-3	9

$$\bar{x} = \frac{\sum x}{n} = \frac{56}{8} = 7$$

$$\sum (x - \bar{x})^2 = 28$$

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

$$= \sqrt{\frac{28}{7}}$$

$$= \sqrt{4}$$

$$= 2$$

$$s = 2$$

$$CV = \frac{s}{\bar{x}} \cdot 100\% = 28.57\%$$

$$= \frac{2}{7} \cdot 100\%$$

Ex. # 36  
Pg. 745

14) In your Introduction to Psychology course you have earned the following exam scores: 74, 81, 56, and 70. With one exam remaining, what do you need to score so that you pass the course with a "C"?

$$\frac{74 + 81 + 56 + 70 + x}{5} = 70$$

$$\frac{281 + x}{5} = 70$$

$$281 + x = 350$$

$$x = 350 - 281$$

$$x = 69$$

Last exam  
must be a 69  
for a "C"