

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.

1.1 pg. 2 1) List and discuss George Polya's method to solve problems.

1. Understand the problem.
 - This first step is key! Without understanding either you can not solve the problem or you are creating a new problem.
2. Devise a plan.
 - That meets the conditions of the problem.
3. Carry out the plan.
 - Execute accurately
4. Check for correctness.
 - Did the problem get answered?

1.1. 2) 2) Continue the pattern for five more items in the given list: ab, ac, ad, ae, bc, bd, be, ...

bf, cd, ce, cf, cg

1.1 pg 7

- 3) What is the last digit in 7^{50} ? 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.

$$\begin{array}{l} 7^1 = \underline{7} \\ 7^2 = \underline{49} \\ 7^3 = \underline{343} \\ 7^4 = \underline{2401} \\ 7^5 = \underline{16807} \\ 7^6 = \underline{117649} \\ 7^7 = \underline{823543} \\ 7^8 = \underline{5764801} \\ 7^9 = \underline{40353607} \\ 7^{10} = \underline{282475249} \end{array} \left. \begin{array}{l} 2 \div 2 = \textcircled{1} \\ 4 \div 2 = 2 \\ 6 \div 2 = \textcircled{3} \\ 8 \div 2 = 4 \\ 10 \div 2 = \textcircled{5} \end{array} \right\}$$

When 2 divides the exponent evenly and the result is odd odd! the last digit is always 9

* Note: $50 \neq 4$, but $50 \div 2 = \textcircled{25}$ odd!
So, the last digit of 7^{50} is $\textcircled{9}$

1.2.27

- 4) Given the following series, make a conjecture as to what the next two equations in the pattern are:

$$1 + 2 = \frac{2 \times 3}{2};$$

$$1 + 2 + 3 = \frac{3 \times 4}{2};$$

$$1 + 2 + 3 + 4 = \frac{4 \times 5}{2}$$

$$\textcircled{1} \quad 1 + 2 + 3 + 4 + 5 = \frac{5 \times 6}{2}$$

$$\textcircled{2} \quad 1 + 2 + 3 + 4 + 5 + 6 = \frac{6 \times 7}{2}$$

1.2.8

- 5) Latisha noticed that on every true-false quiz so far this semester, her instructor has given twice as many false questions as true. On the next quiz, if she is not sure of an answer, she will guess "false". Latisha is using what kind of reasoning? Explain your answer.

Inductive reasoning because Latisha is observing a pattern of specific occurrences leading to her conclusion.

2.1.6

- 6) Use set notation to list all the elements of the set
 $S = \{y \mid y \text{ is an odd natural number between 6 and 20}\}$

$$= \{7, 9, 11, 13, 15, 17, 19\}$$

2.1 pg. 44

- 7) State the correct name and convert into English the following set:

$$\left\{ \frac{a}{b} : a, b \in \mathbb{Z} \text{ and } b \neq 0 \right\}$$

\mathbb{Q} is the set of a divided by b such that a, b are elements of the Integers and b can not equal zero.

2.1

- 8) $\emptyset \in \{ \}$ True or False - Explain.

Both symbols \emptyset and $\{ \}$ represent the same concept - the null set, which is empty.

2.1 pg. 44

- 9) $5 \notin \left\{ \frac{a}{b} : a, b \in \mathbb{Z} \text{ and } b \neq 0 \right\}$ True or False - Explain.

$$5 = \frac{5}{1} \text{ and } \frac{5}{1} \in \mathbb{Q} \text{ because } 5, 1 \in \mathbb{Z}$$

The next two questions refer to the YouTube video *The Beginner's Guide to Excel – Excel Basics Tutorial*.

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

a Cell

11) What was the "Subject" of the narrator's spreadsheet in the video?

His film collection

13.1 pg. 660

12) From Probability Theory define Sample Space.

All possible outcomes

13.1 pg. 660

13) Four children are born to a family and we note the birth order. How many possibilities are in the sample space of this "experiment"? Show how you arrived at your answer.

B_1	B_2	B_3	B_4
g	g	g	g
g	g	b	b
b	b		

Since there are only two possibilities "g" or "b" we use 2^k where $k = 4$. So $2^4 = 16$ possibilities of birth order in the sample space.

13.1 pg. 667

14) In Probability Theory, $P(\emptyset) = ?$ and $P(S) = ?$ Explain.

*$P(\emptyset) = 0$ and $P(S) = 1$
Since $n(\emptyset) = 0$, there are no possible occurrences, thus zero. $P(S) = 1$ because S is all possible outcomes.*

14.1.1

15) Construct a *frequency* and *relative frequency table* for the following. The modes of transportation to campus for 20 students in a Quantitative Skills and Reasoning course are: walk, walk, bike, car, skateboard, walk, bus, car, bike, walk, bike, walk, bus, car, car, bike, walk, bike, bike, and car.

<u>Mode</u>	<u>f</u>	<u>rf</u>
walk	6	$\frac{6}{20} = 0.3 = 30\%$
bike	6	$\frac{6}{20} = 0.3 = 30\%$
car	5	$\frac{5}{20} = 0.25 = 25\%$
skateboard	1	$\frac{1}{20} = 0.05 = 5\%$
bus	2	$\frac{2}{20} = 0.1 = 10\%$
	<hr/>	<hr/>
	$n = 20$	$\frac{1}{100\%}$