

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.

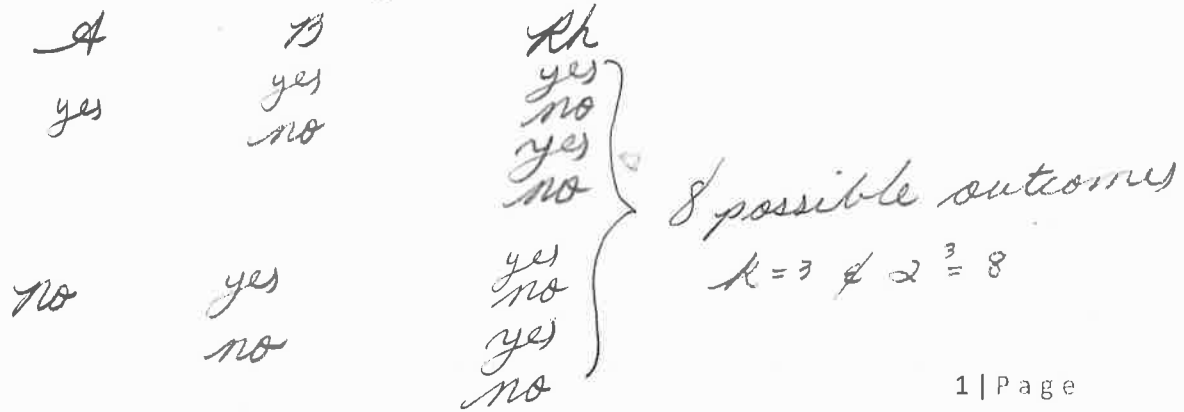
1.1 pg. 2

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 create 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 pg. 4

2) Draw a tree diagram to illustrate the different blood classifications possible if we are considering only A, B, and Rh antigens.



1.1. 21

- 3) 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

- 4) 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.

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

When 2 divides the even exponents and the result is odd, then the last digit is 9.

So, since $50 \div 2 = 25$ is odd, then the last digit of 7^{50} is 9.

$$50 \div 4 = 12.5, \quad 50 \div 2 = \textcircled{25} \text{ odd!}$$

1.2. 27

- 5) 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

- 6) 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 general conclusion.

2.1.6 7)

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 8)

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 set of integers and b can not equal zero.

2.1 9)

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

Both the symbols \emptyset and $\{ \}$ represent the same concept - namely the Null or empty set.

2.1 pg. 44 10)

$5 \notin \left\{ \frac{a}{b} : a, b \in \mathbb{Z} \text{ and } b \neq 0 \right\}$ 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 three questions refer to the YouTube video *The Beginner's Guide to Excel – Excel Basics Tutorial*.

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

a cell

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

His film collection

- 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"?

(B1)

*g
b*

(B2)

*g
b
g
b*

(B3)

*g
b
g
b
⋮*

(B4)

*g
b
g
b
g
b
⋮*

Since "g" or "b" are the only outcomes and four children are born where $k=4$, then we have $2^k = 2^4 = 16$ outcomes

- 14) Define Sample Space.

All possible outcomes.

- 15) 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 or outcomes, thus zero probability. $P(S) = 1$ because S is all possible outcomes.

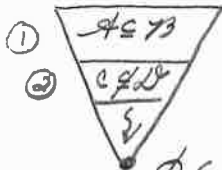
2.1. 51

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

$n(S) = 1$

2.1

17) $\emptyset \subseteq$ any set S True or False? Explain.



$\emptyset \subseteq S$ because if false, then there is something in \emptyset which is not in S , but that is impossible.

1.2.4

18) You tell your friend, Jason, to be ready fifteen minutes before you actually intend to pick him up because he is always late. This is what form of reasoning? Explain.

Inductive - because a pattern is observed leading to a general conclusion.

1.1.37

19) If the price of a Blu-ray player is increased by 10% and then later reduced by 10%, the price will be the same as the original price - True or

False?

If the Blu-ray is \$10.00, then
 $\$10.00 + \$10.00(10\%) = \$11.00$
 But $\$11.00 - \$11.00(10\%) = \$9.90$

14.1.1

20) 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/> n = 20	$\frac{0.1}{1.0} = \frac{10\%}{100\%}$