

Math 163 – Test #2 (Version A) (yellow)

November 23, 2015
 Instructor: Patricia Wrean

Name: Solution Set

Total: 40 points

1. The following statement is true: "If and only if you draw the winning number, you will win a prize." Given that, answer the following questions by circling the correct choice. (4 points)

- a) You don't draw the winning number. Do you win a prize? Yes No / Maybe
- b) You draw the winning number. Do you win a prize? Yes / No / Maybe
- c) You win a prize. Did you draw the winning number? Yes / No / Maybe
- d) You did not win a prize. Did you draw the winning number? Yes No / Maybe

2. Consider the conditional "If the medusa looks at you, you will be turned to stone." If this is true, can the following situations occur? Circle the correct choice. (4 points)

- a) The medusa looks at you and you are turned to stone. Yes / No
- b) The medusa looks at you and you are not turned to stone. Yes No
- c) The medusa does not look at you and you are turned to stone. Yes / No
- d) The medusa does not look at you and you are not turned to stone. Yes / No

3. Use a truth table to simplify the logical expression $(p \rightarrow q) \wedge (\bar{p} \rightarrow q)$. (3 points)

p	q	\bar{p}	$p \rightarrow q$	$\bar{p} \rightarrow q$	$(p \rightarrow q) \wedge (\bar{p} \rightarrow q)$
0	0	1	1	0	0
0	1	1	1	1	1
1	0	0	0	1	0
1	1	0	1	1	1

no conclusion
 -1

each error on table
 -3

$(p \rightarrow q) \wedge (\bar{p} \rightarrow q)$ simplifies to q

4. Let $A=\{1, 3, 5\}$, $B=\{2, 4\}$ and $C=\{3\}$. (3 points)

a) Is $C \times B$ a function? Yes/No

b) Is 5 an element of $A \times B \times C$? Yes/No

c) How many elements would be in the set $A \times A \times B$? 18

3 3 2

5. Consider the data in the following tables. (8 points)

COURSE

Name	Section	Instructor
Math 163	X01	Pat
Math 172	X01	Leah
Math 172	X02	Pat
Math 185	X01	Gilles
Math 185	X02	Leah

TEXTBOOK

Name	Title	Edition
Math 163	Logic is Fun	2 nd
Math 172	Algebra is Fun	6 th
Math 185	Calculus is Fun	2 nd

a) Give the output for the following command: $\sigma_{\text{Edition}="2nd"}(\text{TEXTBOOK})$

2

Name	Title	Edition
Math 163	Logic is Fun	2 nd
Math 185	Calculus is Fun	2 nd

no headers
-1/2
only 1 or 2 columns
-1
set notation also ok

b) Write a sequence of operations that will give the output

3

Name	Section	Instructor	Title	Edition
Math 172	X01	Leah	Algebra is Fun	6 th
Math 185	X02	Leah	Calculus is Fun	2 nd

$\sigma_{\text{Instructor}="Leah"}(\text{COURSE} \bowtie \text{TEXTBOOK})$

c) Write a sequence of operations to list the names, instructors, and the title of the textbook (and no other pieces of info) for the X02 sections of courses.

3

$\pi_{\text{Name, Instructor, Title}}(\sigma_{\text{Section}="X02"}(\text{COURSE} \bowtie \text{TEXTBOOK}))$

6. Label the following sequences as "arithmetic", "geometric" or "neither". (3 points)

- a) 58, 48, 38, ... add -10 arithmetic
- b) 1, 1, 2, 3, 5, 8, ... Fibonacci neither
- c) $\frac{1}{2}, \frac{1}{6}, \frac{1}{18}, \dots$ mult by $\frac{1}{3}$ geometric

7. Consider the sequence given by the following. (4 points)

$$a_n = 30 - 3n, \quad 1 \leq n \leq 3$$

- a) Is this formula recursive or general? (Circle one.) recursive / general
- b) Calculate all terms of this sequence. 27, 24, 21

$$a_1 = 30 - 3(1) = 27$$

$$a_2 = 30 - 3(2) = 24$$

$$a_3 = 30 - 3(3) = 21$$

no if give sum of series (it's a sequence)

8. Evaluate the following sum, if it exists. Show your work! (2 points)

$$\sum_{i=2}^{\infty} 8(-3)^i = 8(-3)^2 + 8(-3)^3 + 8(-3)^4 + \dots$$

geometric with $r = -3$

$|r| < 1$? No!

undefined

9. Calculate the first three terms of the following sequence. (3 points)

$$\begin{cases} a_1 = 3 \\ a_n = (a_{n-1})^2 \end{cases}$$

$$a_2 = a_1^2 = 3^2 = 9$$

$$a_3 = a_2^2 = 9^2 = 81$$

3, 9, 81

10. Write a recursive formula for the sequence defined below and draw a box around your answer. (2 points)

$$a_n = 7 \cdot 3^n$$

$$a_1 = 7 \cdot 3^1 = 21$$

$$a_2 = 7 \cdot 3^2 = 63$$

$$a_3 = 7 \cdot 3^3 = 189$$

$$a_1 = 21$$

$$a_n = 3a_{n-1}$$

geometric with $r=3$

11. Calculate the sum of the odd numbers between 1000 and 5000. Be sure to show your work. (4 points)

$$1001 + 1003 + 1005 + \dots + 4999$$

arithmetic series with $d=2$ (1)

number of terms:

$$a_n = a_1 + (n-1)d$$

$$4999 = 1001 + (n-1) \cdot 2$$

$$3998 = (n-1) \cdot 2$$

$$1999 = n-1$$

$$n = 2000$$

$$S_n = \frac{n}{2} (a_1 + a_n)$$

$$S_{2000} = \frac{2000}{2} (1001 + 4999)$$

$$S_{2000} = 6000000$$

if n correct
but no work,

(-1)

if get n by
last - first + 1

(-2)

if assumed

$S_{\text{odd}} = \text{Seven}$

(-2)

if used even
numbers

(-1) and sum is

$S_{2001} = 6003000$