

Name: _____

MATH 100

Fall 2022

HW 1: Due 09/14

"I can be just as non-competitive as anybody. Matter of fact, I'm the most non-competitive, so I win."

– Peter Griffin, Family Guy

Problem 1. (10pt) Showing all the steps according to order of operations, compute the following:

(a) $10 + 10 - 16 \cdot 0 + 2 + 2$

(b) $(-1)^3 - 1 + 4^2/2$

(c) $15 - (6 - 10) + 3^2$

(d) $\frac{-4 - (2 - 4)^2}{3^2 - 1}$

Problem 2. (10pt) Define the following sets:

$$A = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

$$B = \{2, 4, 6, 8, 10\}$$

$$C = \{1, 3, 5, 7, 9\}$$

$$D = \{2, 3, 5, 7\}E = \{2, 3, 4, 6, 8, 9\}$$

Consider all these sets as subsets of A . Compute the following:

(a) B^c

(b) $B \cup D$

(c) $E \setminus D$

(d) $C \cap E$

(e) $|A|$

Problem 3. (10pt) Define the following sets:

A = All males over 40 years old.

B = All people that have acted in a movie.

C = All US Presidents, alive or dead.

D = All persons under 6 ft tall.

Consider all of these sets as subsets of the set of all people alive. Being sure to completely justify your response, answer the following:

(a) Find an element of $A \cap B$.

(b) Is Jeff Bezos $\in A \cup C$? Is Jeff Bezos $\in C \cup D$?

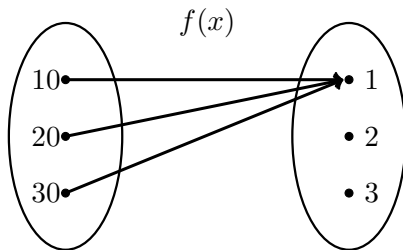
(c) Is George Washington $\in C - B$?

(d) Is Danny Devito $\in D^C$?

(e) Are sets B and C disjoint? [Hint: Consider US Presidents from the last 50 years.]

Problem 4. (10pt) Determine whether the following relations are functions, being sure to justify your answer. If the relation is a function, determine its domain, codomain, and range. [For this problem, in determining a functions domain, codomain, and range, you may invoke the use/description of a graph.]

(a)



(b)

x	$g(x)$
1.0	1.0
1.5	4.3
3.0	-6.1
4.4	2.2
6.8	1.0

(c) $h(x, y) = x + y^4$.

(d) $j(x) = \text{the multiple of two closest to } x$.

Problem 5. (10pt) Suppose that $f(x, y)$ is the function given by the following table:

$x \backslash y$	1	2	3	4
1	-2	7	4	-4
2	0	3	-1	1
3	5	-6	7	6
4	1	0	4	0

Showing all your work, compute the following:

(a) $f(3, 2)$

(b) $f(3 - 1, 2^2)$

(c) $5f(3, 1) - 8$

(d) $\frac{4 - f(3^2 + (-2)^3, 1)}{2f(1, 3)}$

Problem 6. (10pt) Let $\text{rdwn}(x)$ denote the largest integer that is *less than* x .

- (a) Find $\text{rdwn}(x)$ for $x = 0.5, 2.2, 5.9, 6.0, -1.5, -4.9, -7$.
- (b) Explain why $\text{rdwn}(x)$ is a function.
- (c) Being as accurate as possible, sketch a graph of $\text{rdwn}(x)$ on the plot below.

