Background lab solutions

1) a)

- set of odd integers.
- set of even integers.
- ~~$\{n \mid n = 2m$ for some $m \in \mathbb{N}$ and $m = 3k$ for some $k \in \mathbb{N}\}$~~ set of integers multiple of 6.
- empty set $\{\}$

1) b)

- $\{1, 10, 100\}$
- $\{n \mid n \in \mathbb{Z} \text{ and } n > 5\} = \{6, 7, 8, \ldots\}$
- $\{0, 1, 2, 3, 4\}$

1) c)

- No, $A \not\subseteq B$
- Yes, $B \subseteq A$
- $\{x, y, z\}$
- $\{x, y\}$
- $A \times B = \{(x,x), (x,y), (y,x), (y,y), (z,x), (z,y)\}$
- $P(B) = \{\phi, \{x\}, \{y\}, \{x,y\}\}$

2)

- $f(2) = 7$
- Domain: X , Range: $\{6, 7\}$
- $g(2, 10) = 6$
- Domain: $X \times Y$, Range: Y
- $g(4, f(4)) = g(4, 7) = 8$

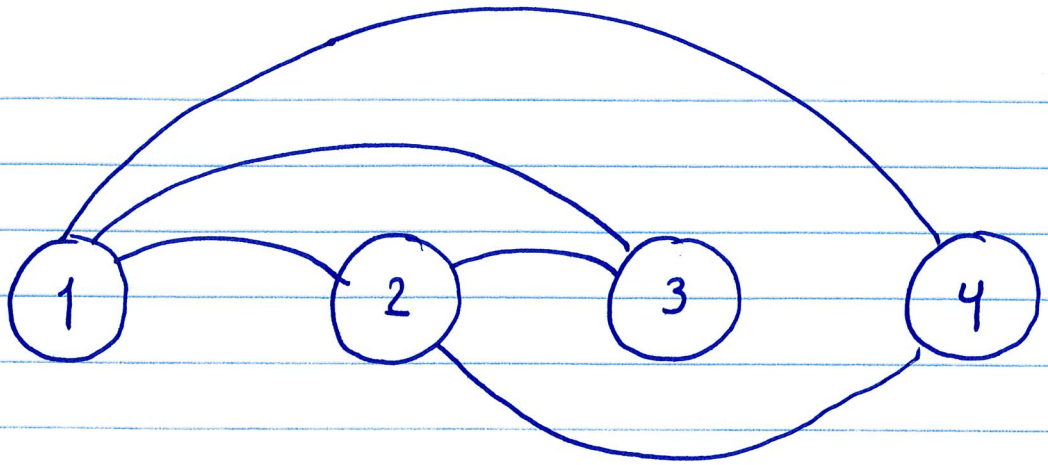
3)

- Assume there is a largest even number (call it r)

$2 + r$ is even and $2 + r > r$
(Contradiction!)

Therefore, the assumption is false and there is no largest even number.

4)



- $d(1) = 3$

$d(2) = 3$

$d(3) = 2$

$d(4) = 2$

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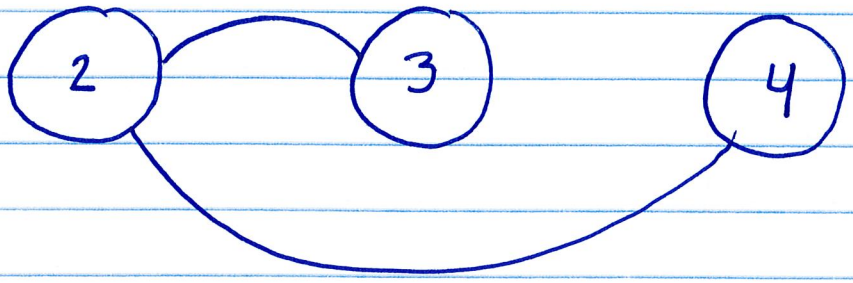

5)

- $w1 = 01$

  $w2 = 001$

- $w1 = 11$

  $w2 = 00$

- $\{w \mid w$ start with any number (including zero) of 0 or 1, followed by 01 followed by any number (including zero) of 0 or 1 $\}$

  in other words:

  $\{w \mid w$ is any string that has 01 as substring $\}$