Homework #1

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0.1)
a) This set contains all odd numbers from 1 to ∞
b) This set contains all even numbers from $-\infty$ to ∞
c) Any number in the set of Natural numbers that is divisible by 2
d) Any number in the set of Natural numbers that is divisible by both 2 and 3
e) Any string that is a palindrome made up of 0's and 1's
f) Any integer that is equal to 1 added by the input number

0.2)
a) $\{1, 10, 100\}$
b) $\{n \mid n \in \mathbb{Z}, and\ n > 5\}$
c) $\{n \mid n \in \mathbb{N}, and\ n > 5\}$
d) $\{ab\}$
e) $\{\epsilon\}$
f) $\emptyset$

0.3)
a) no
b) yes
c) $\{x, y, z\}$
d) $\{x, y\}$
e) $\{(x, x), (x, y), (y, x), (y, y), (z, x), (z, y)\}$
f) $\{\emptyset, \{x\}, \{y\}, \{x, y\}\}$

0.4) There are a*b elements in this set because each element of 'a' must pair with each element of 'b'. Therefore, there are a*b ordered pairs in this set.

0.5) There are 2^c elements in the power set of C. This is true because each subset of the original set has two subsets of its own that can be derived. This happens n times until only $\emptyset$ is remaining. Therefore, there are 2^n elements in the power set of a set and, in our case, 2^c.

0.6)
a) 7 b) Range $= \{6, 7\}$, Domain $= \{1, 5\}$
c) g(2,10) $= 6$

d) Range = $\{6,10\}$, Domain =$\{(1,6), (1,7), (1,8), (1,9), (1,10),$
$(2,6), (2,7), (2,8), (2,9), (2,10),$
$(3,6), (3,7), (3,8), (3,9), (3,10),$
$(4,6), (4,7), (4,8), (4,9), (4,10),$
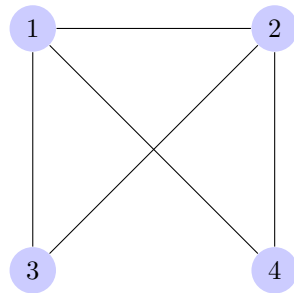$(5,6), (5,7), (5,8), (5,9), (5,10)\}$

e) g(4, f(4)) = 8

0.7)

a) Two people who have the same mother but different fathers
b) x,y $\in \mathbb{N}$ and $x - y \leq 0$
c) $x, y \in \mathbb{Z}$ and $i * j > 0$

0.8)

The path for node 3 to node 4 would go 3–>2–>4. I tried to get the graph lines to bold but could not figure it out.

Node	Degree
1	3
2	3
3	2
4	2

0.9)
G = (V,E)
$G = \{\{1, 2, 3, 4, 5, 6\}, \{(1, 4), (1, 5), (1, 6), (2, 4), (2, 5), (2, 6), (3, 4), (3, 5), (3, 6)\}\}$