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Question 3:

4.1.3.B
Answer:
f(x) is not a function. No range

4.1.3.C
Answer:
f(x) is a well-defined function. The range is the set of all positive/ non negative real numbers.

4.1.5.B
Answer:
Range is {4, 9, 16, 25}

4.1.5.D
Answer:
Range is {0, 1, 2, 3, 4, 5}

4.1.5.H
Answer:
Range is {(1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), (3,3)}

4.1.5.I
Answer:
Range is {(1,2), (1,3), (1,4), (2,2), (2,3), (2,4), (3,2), (3,3), (3,4)}

4.1.5.L
Answer:
Range is {ø, {2}, {3}, {2,3}}

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Question 4:

4.2.2.C

Answer:

One-to-one but not onto, because 3 ∈ Z, but there’s no integer x that h(x) = 3
Therefore, it’s not onto.

4.2.2.G

Answer:

One-to-one, because each element on the domain is mapping to different elements in the target.
Not onto; because the (1,1) ∈{Z x Z}, however, there’s no (x,y) where f(x,y) = (x+1, 2y)= (1,1).

4.2.2.K

Answer:

Neither one-to-one nor onto.

Not one-to-one. For example, f(2,2) = f(1,4) = 6.

Not onto, for 1 ∈ Z^+, but there’s no set of (x,y) where f(x,y) = 2^x + y =1

4.2.4.B

Answer:

neither one-to-one nor onto
Not one-to-one, because f(010) = f(110) = 110
Not onto, because 001 ∈ $\{0, 1\}^3$ and there’s no f($\{0, 1\}^3$) = 001

4.2.4.C

Answer:

one-to-one and onto

4.2.4.D

Answer:

one-to-one but not onto
This function is one-to-one, because each element in the domain is mapping to a different element in the target. However, it’s not onto, because 0001 is an element in set $\{0, 1\}^4$, but there’s no f($\{0, 1\}^3$) = 0001.

4.2.4.G

Answer:

neither one-to-one nor onto
f(x) is not one to one. For example, f(2)=f(1,2)=(2-{1})
f(x) is not onto, because the range of f(x) is not equal to the range of target. For example, {1,2,3}
is an element in P(A), and there’s no f(X) = {1,2,3}.

II.A

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one-to-one, but not onto
Answer:
$f(x) = \left\{ \begin{array}{l} 6 x x > 0 \\ 6 \vee x \vee + 1 x \leq 0 \end{array} \right\}$

II.B
onto, but not one-to-one
Answer:
Answer: f(x) = x^2**+1**

II.C
one-to-one and onto
Answer:
$f(x) = \left\{ \begin{array}{l} 6 \vee x \vee + 1 x \geq 0 \\ - 6 x x < 0 \end{array} \right\}$

II.D
neither one-to-one nor onto
Answer:
f(x) = 18

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Question 5:

4.3.2.C
Answer:
y=2x+3
y-3 = 2x
(y-3)/2 = x
Therefore, f^{-1}x=(x-3)/2

4.3.2.D
Answer:
This function has no inverse function and is not one-to-one, so f^{-1}(x) is not well-defined.
This function is not one-to-one, because when f({1}) = f({2}) = 1.

4.3.2.G
Answer:
f^{-1} = f. For x ∈ $\{0,1\}^3$, f(x) = y is and only if f(y) = x.
This function is well-defined, and f(x) is bijection.

4.3.2.I
Answer:
f^{-1}(x) = x+5
f^{-1}(y) = y+2
therefore, f^{-1}(x,y) = (x-5, y+2)

4.4.8.C
Answer:
f o h(x) = 2(x^2 + 1) +3 = 2x^2 + 5

4.4.8.D
Answer:
h o f(x) = (2x +3)^2 = 4x^2 + 12x+10.

4.4.2.B
Answer:
121

4.4.2.C
Answer:
16

4.4.2.D
Answer:
h o f(x) = $\lceil \frac{x^2}{5} \rceil$

4.4.6.C
Answer:
111

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4.4.6.D
Answer:
{101, 111}

4.4.6.E
Answer:
{001, 011, 101, 111}
