Problem

Let X be the set {1, 2, 3, 4, 5} and Y be the set {6, 7, 8, 9, 10}. The unary function f : X → Y and the binary function g : X ×Y →Y are described in the following tables.

n	$f(n)$
1	6
2	7
3	6
4	7
5	6

g	6	7	8	9	10
1	10	10	10	10	10
2	7	8	9	10	6
3	7	7	8	8	9
4	9	8	7	6	10
5	6	6	6	6	6

a. What is the value of f(2)?

b. What are the range and domain of f?

c. What is the value of g(2, 10)?

d. What are the range and domain of g?

e. What is the value of g(4, f(4))?

Step-by-step solution

Step 1 of 5

a)

The value of the function *f* at n is 2 is 7.

Therefore, the value of $f(2)=7$

Comment

Step 2 of 5

b)

The set of all possible dependent value of the outputs of a function is called the Range.

The set of all possible inputs to the function is called its Domain.

From the given values n, and f(n), the Range and Domain are as follows:

• Range $R=\{6,7\}$

• Domain $D=\{1,2,3,4,5\}$

Comment

Step 3 of 5

c)

The value in the function $g(i,j)$, where *i* is the row label and *j* is the column label.

Then the value at the row labeled *2* and the column labeled *10* in the table is $\boxed{g(2,10)=6}$

Comment

Step 4 of 5

d)

The Range of the function *g* is $R = \{6 \quad ,8,9,10\}$

The Domain of the function *g*, which is the input values in the table goes into the function $g(i,j)$

From the table $g(i,j)$

$$\mathrm{X} = \{1,2,3,4,5\}$$

$$\mathrm{Y} = \{6,7,8,9,10\}$$

$$\begin{aligned}\text{Domain } \mathrm{D} &= \mathrm{X} \times \mathrm{Y} \\ &= \{(1,6),(1,7),(1,8),(1,9),(1,10),(2,6),(2,7),(2,8), \\ &\quad (2,9),(2,10),(3,6),(3,7),(3,8),(3,9),(3,10)(4,6), \\ &\quad (4,7),(4,8),(4,9),(4,10)(5,6),(5,7),(5,8),(5,9),(5,10)\}\end{aligned}$$

Comment

Step 5 of 5

e)

• If f is a function of the form $f(a)=b$, *b* is the output value when the input value is *a*

• The entry at the row labeled *i* and the column labeled *j* in the table is the value of *g (i, j)*.

• The value of the function f at n=4 is 7, which is $f(4)=7$

$$\begin{aligned}\text{The value of function } g(4, f(4)) &= g(4,7) \\ &= 8\end{aligned}$$

Comment