Solutions essay example

Sociology, Community

Question 1

R { 1, 2, 3, 4 }

Z { 5, 6, 7, 8 }

F is a subset of RZ

Where each element X ∈ R

and each element Y ∈ Z

(x, y) ∈ F

F subset { y ∈ Z| (x, y) ∈ F for some x ∈ R}

R is the domain

Z is the codomain

, (4), ∈ Z

2. 65 to 6. 65

On the graph point 2. 65 is (2. 65, 4)

And point 6. 65 is (6. 65, 4)

x ∈ Z y ∈ R

(x, y) ∈ F is a subset of RZ

Using = 4 Transforming R along itself

R (2. 65, 4)

F(6. 65, 4)

R + Z defines a function since each element of R occurs only once among the ordered pairs.

Where set:

R is the domain of the function

Z is the codomain of the function

Subset { y ∈ Z|(x, y) ∈ F for some/all x ∈ R } of the codomain is called the image of the function.

The Algebraic equation is defined as:

(2. 65, 4)

(6. 65, 4)

m = = 0

(2. 65, 4), (x, y) and m = 0

Equation:
0

y -4 = 0

∴ y = 4

Question 2

a) When = 7

, (7), ∈ Z

2. 65 to 6. 65

On the graph point 2. 65 is (2. 65, 7)

And point 6. 65 is (6. 65, 7)

x ∈ Z y ∈ R

(x, y) ∈ F is a subset of RZ

Using = 7 Transforming R along itself

R (2. 65, 7)

F (6. 65, 7)

R + Z defines a function since each element of R occurs only once among the ordered pairs.

Where set:

R is the domain of the function

Z is the codomain of the function

Subset { y ∈ Z|(x, y) ∈ F for some/all x ∈ R } of the codomain is called the image of the function.

The Algebraic equation is defined as:

(2. 65, 7)

(6. 65, 7)

m = = 0

(2. 65, 7), (x, y) and m = 0

Equation:
0

y -7 = 0

∴ y = 7

b) When = -12

, (-12), ∈ Z

2. 65 to 6. 65

On the graph point 2. 65 is (2. 65, -12)

And point 6. 65 is (6. 65, -12)

$x \in Z$ $y \in R$

$(x, y) \in F$ is a subset of RZ

Using = -12 Transforming R along itself

R (2. 65, -12)

F (6. 65, -12)

R + Z defines a function since each element of R occurs only once among the ordered pairs.

Where set:

R is the domain of the function

Z is the codomain of the function

Subset $\{ y \in Z | (x, y) \in F$ for some/all $x \in R \}$ of the codomain is called the image of the function.

The Algebraic equation is defined as:

(2. 65, -12)

(6. 65, -12)

m = = 0

(2. 65, -12), (x, y) and m = 0

Equation:

0

$y -(-12) = 0$

$\therefore y = -12$

c) When = 0

, (0), ∈ Z

2. 65 to 6. 65

On the graph point 2. 65 is (2. 65, 0)

And point 6. 65 is (6. 65, 0)

x ∈ Z y ∈ R

(x, y) ∈ F is a subset of RZ

Using = 0 Transforming R along itself

R (2. 65, 0)

F (6. 65, 0)

R + Z defines a function since each element of R occurs only once among the ordered pairs.

Where set:

R is the domain of the function

Z is the codomain of the function

Subset { y ∈ Z|(x, y) ∈ F for some/all x ∈ R } of the codomain is called the image of the function.

The Algebraic equation is defined as:

(2. 65, 0)

(6. 65, 0)

m = = 0

(2. 65, 7), (x, y) and m = 0

Equation:
0

y -0 = 0

∴ y = 0

d) When = 5 + n

, (5 + n), ∈ Z

2. 65 to 6. 65

On the graph point 2. 65 is (2. 65, 5 + n)

And point 6. 65 is (6. 65, 5 + n)

x ∈ Z y ∈ R

(x, y) ∈ F is a subset of RZ

Using = 5 + n Transforming R along itself

R (2. 65, 5 + n)

F (6. 65, 5 + n)

R + Z defines a function since each element of R occurs only once among the ordered pairs.

Where set:
R is the domain of the function

Z is the codomain of the function

Subset { y ∈ Z|(x, y) ∈ F for some/all x ∈ R } of the codomain is called the image of the function.

The Algebraic equation is defined as:

(2. 65, 5 + n)

(6. 65, 5 + n)

m = = 0

(2. 65, 5 + n), (x, y) and m = 0

Equation:
0

y – (5 + n) = 0

∴ y = 5+n

e) When n + m

, (n + m), ∈ Z

2. 65 to 6. 65

On the graph point 2. 65 is (2. 65, n + m)

And point 6. 65 is (6. 65, n + m)

x ∈ Z y ∈ R

(x, y) ∈ F is a subset of RZ

Using = n + m Transforming R along itself

R (2. 65, n + m)

F (6. 65, n + m)

R + Z defines a function since each element of R occurs only once among the ordered pairs.

Where set:
R is the domain of the function

Z is the codomain of the function

Subset { y ∈ Z|(x, y) ∈ F for some/all x ∈ R } of the codomain is called the image of the function.

The Algebraic equation is defined as:

(2. 65, n + m)

(6. 65, n + m)

m = = 0

(2. 65, n + m), (x, y) and m = 0

Equation:
0

y – (n + m) = 0

∴ y = n + m

Question 3

R = { 0, 1, 2, 3, 4, . }

Z = { -1, 0, 1, 2, 3, 4, }

F applying to R

F ∈ RZ = to R

F1 ∈ to R

F2 ∈ ∗ to R

F2 ∈ to R

For example:

R = { 1, 2, 3 }

Z = { 0, 1, 2, 3, 7,}

R = (1, 0) (2, 0) (3, 0)

F1 to R = (4, 0) (5, 0) (6, 0)

F2 to F1 = (15, 0) (16, 0) (17, 0)

∴ F2 = to (or R) = R

14 To R = (1, 0) (2, 0) (3, 0)

= (15, 0) (16, 0) (17, 0)

Both the combination of these to R transformation and the individual transformation ∗ are equal to each other as they yield the same result.

Question 4

R = { (a, 0) (b, 0) (c, 0) }

F1 = to R = {(a+k, 0), (b+k, 0), (c+k, 0)}

∗ to R = {(a+k+t, 0), (b+k+t, 0), (c+k+t, 0)}

∴

∗ to R =(+) to R

Question 5

Let

R be {1, 2, 3}

Z be {1, 2, 3}

Picking 2 ∈ Z and 3 ∈Z

Applying translation 2 and then 3

F1 = to R = {(3, 0) (4, 0) (5, 0)}

F2 = to F1 = {(6, 0) (7, 0) (8, 0)}

F2 = ∗ to R

F1 but to R = {(3, 0) (4, 0) (5, 0)}

F2 and to R = {(4, 0) (5, 0) (6, 0)}

F1 + F2

= {(7, 0), (9, 0), (11, 0)}

∴

(∗)R ≠ R + R

Thus the binary operation is not the same as the addition of functions.

Question 6

F1 to R

F2 = to F1 = to(to R)

(∗) to R

(+) to R

( ) to R

∴ the binary expression is not really as the same as the compositio of functions as the chain rule doesn't apply to the combinaation of transformations due to the fact that this particular tranformatios are not multiplied or raised to certain power.

Question 7

This is the equation for transformation.

Question 8

For all elements of S acting on R

Subset F

Where:

R is the domain of the function, and,

S is the codomain of the function.

(i) In R{(2, 0),(4, 0),(6, 0)}

The distance between

Thus the distance between points X and Y is preserved.

(ii)

(iii)

(iv)

(v)

(vi) In both R and F the property of being a prime integer is not preserved as some of the numbers can be divided by numbers other than 1 or the number itself.

Question 9

Group has its subgroups

Then

And

Question 9

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Question 9

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While,

The mapping:

Defined by h: is the desired Isomorphism

Question 10

Consider the group (Z, +) and its subgroups H = h2i and K = h3i . Then H+K

= h2i+h3i = Z

and H ∩ K = h6i . Theorem 5. 2. 6 says that

H/(H ∩ K) ' (H + K)/K,

i. e.,

h2i / h6i ' Z/ h3i .

This isomorphism is evident if we notice that h2i / h6i = {0 + h6i , 2 + h6i , 4

+ h6i} while Z/ h3i = {0 + h3i ,

1 + h3i , 2 +h3i}. The mapping

h : h2i / h6i → Z/ h3i

defined by h : 0+h6i → 0 + h3i , 2 + h6i → 2 + h6i →→ h3i , 4 +h6i → 1 + h3i

is the desired isomorphism.