

4.16

One-to-One Functions

• Example 1

Given the function F defined on the set $\{1, 2, a, b, c\}$, find a relation A , as small as possible, such that $F \setminus A$ is a one-to-one function.

$$F = \{(1, a), (2, b), (c, a), (b, b), (a, 3)\}$$

We remove the set $A = \{(c, a), (b, b)\}$ leaving

$$F \setminus A = \{(1, a), (2, b), (a, 3)\}$$

which is a one-to-one function. Note that we could remove more ordered pairs from the relation F but we want A as small as possible. Also, we could have removed the ordered pair $(1, a)$ instead of (c, a) or $(2, b)$ instead of (b, b) .

● ● ● CHECK YOURSELF 1

Given the function F defined on the set $\{a, 1, 3, 4, 9\}$, find a relation A , as small as possible, such that $F \setminus A$ is a one-to-one function.

$$F = \{(1, 5), (9, 6), (4, 1), (3, 5), (a, 1)\}$$

● ● ● CHECK YOURSELF ANSWER

1. $A = \{(3, 5), (a, 1)\}$.

Note: this answer is not unique.

4.16 Exercises

Name _____

Section _____

Date _____

A N S W E R S

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Given the following, find a relation A , as small as possible, such that $F \setminus A$ is a one-to-one function.

1. $F = \{(a, b), (1, b), (2, c), (c, 3), (b, b)\}$

2. $F = \{(2, 5), (3, 0), (1, 1), (0, 0), (4, 1), (5, 5)\}$

3. $F = \{(c, 1), (2, c), (d, 1), (a, 4), (b, b), (1, c)\}$

4. $F = \{(0, a), (b, b), (c, c), (1, 0), (2, a), (c, b)\}$

5. $F = \{(1, 4), (5, 1), (3, c), (2, a), (a, b)\}$

6. $F = \{(d, c), (c, a), (1, a), (2, c), (3, a)\}$

7. $F = \{(7, 1), (3, 9), (4, 8), (2, 1), (5, 4), (1, 3)\}$

8. $F = \{(a, a), (b, b), (c, b), (1, c), (2, a)\}$

9. $F = \{(1, b), (2, c), (3, a), (a, a), (4, b)\}$

10. $F = \{(0, b), (2, a), (4, b), (b, 4), (6, 0), (a, b)\}$