Section 2.1: Relations

Exercises

Write the relation as a set of ordered pairs.

1.

x	*y*
1	4
2	3
3	3
4	4

2.

fruit	*colour*
apple	red
orange	orange
banana	yellow
mango	green
peach	blue
apricot	purple

Write the relation as a table.

3. {(red,green},(green,red),(red,red),(green,green)}

4. {(Ford, 4 doors),(Honda, 4 doors), (Honda, 2 doors), (Saturn, 4 doors)}

Which of the following relations are functions?

5. The table in question 1.
6. The table in question 2.
7. The set in question 3.
8. The set in question 4.

Find the following relations and state whether each relation is also a function.

9. Let $x \in \{1,2\}$ and $y \in \{1, 2, 3\}$. $(x,y) \in$ A if x/y is an integer.

10. Let $x \in \{1,2\}$ and $y \in \{1, 2, 3\}$. $(x,y) \in$ A if $x < y$.

11. Let $x \in \{1, 2, 3\}$ and $y \in \{1, 2, 3, 4\}$. $(x,y) \in$ A if $x + y = 5$.

12. Let $x \in \{1, 2, 3, 4\}$ and $y \in \{1, 2, 3, 4\}$. $(x,y) \in$ A if $xy = 4$.

13. Let $x \in \{2, 4, 6\}$ and $y \in \{1, 2, 3\}$. $(x,y) \in$ A if $x - y = 3$.

14. Let $x \in \{2, 4, 6\}$ and $y \in \{1, 2, 3\}$. $(x,y) \in$ A if $x < y$.

Let A = {0,1}, B = {a,b}, and C = {α}. List the elements of the following Cartesian products.

15. C×C×C

16. A×C

17. B×C

18. A×A

19. B×B×A

20. A×B×C

Let A = {0,1}, B = {1,2}, and C = {0,1,2}. Are the following statements true or false? (Be sure to show your work.)

21. A×A $\subset$ A×C

22. A×A $\subseteq$ C×A

23. B×A $\subseteq$ A×B

24. C×A $\subset$ B×C