

### Exercise 5.4

For more educational resources visit

[www.taleemcity.com](http://www.taleemcity.com)

**Q. 1:** If  $A = \{a, b\}$ ,  $B = \{c, d\}$ , then find  $A \times B$  and  $B \times A$ .

$$\begin{aligned} A \times B &= \{a, b\} \times \{c, d\} \\ &= \{(a, c), (a, d), (b, c), (b, d)\} \end{aligned}$$

$$\begin{aligned} B \times A &= \{c, d\} \times \{a, b\} \\ &= \{(c, a), (c, b), (d, a), (d, b)\} \end{aligned}$$

**Q. 2:** If  $A = \{0, 2, 4\}$ ,  $B = \{-1, 3\}$ , then find  $A \times B$ ,  $B \times A$ ,  $A \times A$ ,  $B \times B$

$$\begin{aligned} A \times B &= \{0, 2, 4\} \times \{-1, 3\} \\ &= \{(0, -1), (0, 3), (2, -1), (2, 3), (4, -1), (4, 3)\} \end{aligned}$$

$$\begin{aligned} B \times A &= \{-1, 3\} \times \{0, 2, 4\} \\ &= \{(-1, 0), (-1, 2), (-1, 4), (3, 0), (3, 2), (3, 4)\} \end{aligned}$$

$$\begin{aligned} A \times A &= \{0, 2, 4\} \times \{0, 2, 4\} \\ &= \{(0, 0), (0, 2), (0, 4), (2, 0), (2, 2), (2, 4), (4, 0), (4, 2), (4, 4)\} \end{aligned}$$

$$\begin{aligned} B \times B &= \{-1, 3\} \times \{-1, 3\} \\ &= \{(-1, -1), (-1, 3), (3, -1), (3, 3)\} \end{aligned}$$

**Q. 3:** Find  $a$  and  $b$ , if

(i)  $(a - 4, b - 2) = (2, 1)$

from above ordered pair we have

$$a - 4 = 2$$

$$a = 6$$

$$b - 2 = 1$$

$$b = 3$$

(ii)  $(2a + 5, 3) = (7, b - 4)$

from above ordered pair we have

$$2a + 5 = 7$$

$$2a = 2$$

$$a = 1$$

$$3 = b - 4$$

$$b - 4 = 3$$

$$b = 7$$

(iii)  $(3 - 2a, b - 1) = (a - 7, 2b + 5)$

from above ordered pair we have

$$3 - 2a = a - 7$$

$$-2a - a = -7 - 3$$

$$-3a = -10$$

$$a = \frac{10}{3}$$

$$b - 1 = 2b + 5$$

$$b - 2b = 5 + 1$$

$$\begin{aligned} -b &= 6 \\ b &= -6 \end{aligned}$$

**Q. 4:** Find the sets  $X$  and  $Y$ , if  $X \times Y = \{(a, a), (b, a), (c, a), (d, a)\}$

As we know first elements (domain) of ordered pairs are related to first set i.e.  $X$  and second elements (range) of ordered pairs are related to  $Y$ . So,

$$X = \{a, b, c, d\}$$

$$Y = \{a\}$$

**Q. 5:** If  $X = \{a, b, c\}$  and  $Y = \{d, e\}$ , then find the number of elements in

(i) No. of Elements in  $X = m = 3$

No. of Elements in  $Y = n = 2$

So,

$$\begin{aligned} \text{No. of Elements in } X \times Y &= m \times n \\ &= 3 \times 2 \\ &= 6 \end{aligned}$$

(ii) No. of Elements in  $X = m = 3$

No. of Elements in  $Y = n = 2$

So,

$$\begin{aligned} \text{No. of Elements in } Y \times X &= n \times m \\ &= 2 \times 3 \\ &= 6 \end{aligned}$$

(iii) No. of Elements in  $X = m = 3$

So,

$$\begin{aligned} \text{No. of Elements in } X \times X &= m \times m \\ &= 3 \times 3 \\ &= 9 \end{aligned}$$