EXERCISE 5.4

Q.1 If A = {a, b} and B = {c, d}, then find A × B and B × A

Solution:

A × B = {a, b} × {c, d}

= {(a, c), (a, d), (b, c), (b, d)}

B × A = {c, d} × {a, b}

= {(c, a), (c, b), (d, a), (d, b)}

Q.2 If A = {0, 2, 4} , B = {-1,3}, then find A× B, B × A, A × A, B × B

Solution:

A × B = {0, 2, 4} × {-1, 3}

={(0,-1),(0,3),(2,-1),(2,3),(4,-1),(4,3)}

B × A = {-1, 3} × {0, 2, 4}

= {(-1,0),(-1,2),(-1,4),(3,0),(3,2),(3,4)}

A× A = {0, 2, 4} × {0, 2, 4}

={(0,0),(0,2),(0,4),(2,0),(2,2),(2,4),(4,0)(4,2),(4,4)}

B × B = {-1, 3} × {-1, 3}

= {(-1, -1), (-1, 3), (3, -1), (3, 3)}

Q.3 Find a and b if

Solution:

(i) (a − 4, b − 2) = (2, 1)

a − 4 = 2 , b − 2 = 1

a = 2+ 4 , b = 1 + 2

$\boxed{a = 6}$, $\boxed{b = 3}$

(ii) (2a + 5, 3) = (7, b − 4)

2a + 5 = 7 , 3 = b − 4

2a = 7 − 5 , 3 + 4 = b

2a = 2 , 7 = b

a $\dfrac{2}{2}$ 1 , $\boxed{b = 7}$

$\boxed{a = 1}$

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

3 − 2a = a − 7 , b − 1 = 2b + 5

3 + 7 = a + 2a , −1 − 5 = 2b − b

10 = 3a , −6 = b

$\dfrac{10}{3}$ = a $\boxed{b = -6}$

$\boxed{a = \dfrac{10}{3}}$

Q.4 Find the sets X and Y if X×Y = {(a, a), (b, a), (c, a), (d, a)}

Solution:

X×Y = {(a, a), (b, a), (c, a), (d, a)}

X×Y = {a, b, c, d} × {a}

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) X × Y (ii) Y × X (iii) X × X

Solution:

No. of elements in X = 3

No. of elements in Y = 2

(i) No. of Elements in X×Y = 3×2= 6

(ii) No. of Elements in Y×X = 2×3= 6

(iii) No. of Elements in X×X =3×3= 9