

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

Solution:

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

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

Solution: (i) $A \times B$

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

(ii) $B \times A$

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

(iii) $A \times A$

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

(iv) $B \times B$

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

Q.3 Find a and b if

Solution:

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

$$a - 4 = 2 \quad , \quad b - 2 = 1$$

$$a = 2 + 4 \quad , \quad b = 1 + 2$$

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

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

$$2a + 5 = 7 \quad , \quad 3 = b - 4$$

$$2a = 7 - 5 \quad , \quad 3 + 4 = b$$

$$2a = 2 \quad , \quad 7 = b$$

$$a = \frac{2}{2} \quad , \quad \boxed{b = 7}$$

$$\boxed{a = 1}$$

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

$$3 - 2a = a - 7 \quad , \quad b - 1 = 2b + 5$$

$$3 + 7 = a + 2a \quad , \quad -1 - 5 = 2b - b$$

$$10 = 3a \quad , \quad -6 = b$$

$$\frac{10}{3} = a \quad , \quad \boxed{b = -6}$$

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

Q.4 Find the sets X and Y if

$$X \times Y = \{(a, a), (b, a), (c, a), (d, a)\}$$

Solution:

$$X \times Y = \{(a, a), (b, a), (c, a), (d, a)\}$$

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

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

$$Y = \{a\}$$

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

Solution:

No. of elements in $X = n(X) = 3$

No. of elements in $Y = n(Y) = 2$

(i) No. of elements in $X \times Y = n(X \times Y) = 3 \times 2 = 6$

(ii) No. of elements in $Y \times X = n(Y \times X) = 2 \times 3 = 6$

(iii) No. of elements in $X \times X = n(X \times X) = 3 \times 3 = 9$

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