Exercise 7A

Q24

**Answer :**

We have:

$$\begin{aligned}(ax+by)^2+(bx-ay)^2 &= \left(a^2x^2+b^2y^2+2axby\right)+\left(b^2x^2+a^2y^2-2bxay\right)\\ &= a^2x^2+a^2y^2+b^2y^2+b^2x^2+2axby-2bxay\\ &= a^2\left(x^2+y^2\right)+b^2x^2+b^2y^2+2axby-2axby\\ &= a^2\left(x^2+y^2\right)+b^2\left(x^2+y^2\right)\\ &= \left(x^2+y^2\right)\left(a^2+b^2\right)\end{aligned}$$

$$\therefore (ax+by)^2+(bx-ay)^2=\left(x^2+y^2\right)\left(a^2+b^2\right)$$

Q25

**Answer :**

We have:

$$\begin{aligned}ab^2+(a-1)b-1 &= ab^2+ba-b-1\\ &= \left(ab^2+ba\right)-(b+1)\\ &= ab(b+1)-1(b+1)\\ &= (b+1)(ab-1)\end{aligned}$$

$$\therefore ab^2+(a-1)b-1=(b+1)(ab-1)$$

## Q26

**Answer :**

We have:

$$\begin{aligned}x^3-3x^2+x-3 &= \left(x^3-3x^2\right)+(x-3)\\ &= x^2(x-3)+1(x-3)\\ &= (x-3)\left(x^2+1\right)\end{aligned}$$

$$\therefore x^3-3x^2+x-3=(x-3)\left(x^2+1\right)$$

## Q27

**Answer :**

We have:

$$\begin{aligned}ab\left(x^2+y^2\right)-xy\left(a^2+b^2\right) &= abx^2+aby^2-a^2xy-b^2xy\\ &= abx^2-a^2xy+aby^2-b^2xy\\ &= ax(bx-ay)+by(ay-bx)\\ &= ax(bx-ay)-by(bx-ay)\\ &= (bx-ay)(ax-by)\end{aligned}$$

$$\therefore ab\left(x^2+y^2\right)-xy\left(a^2+b^2\right)=(bx-ay)(ax-by)$$

Q28

**Answer :**

We have:

$$x^2 - x(a+2b) + 2ab = x^2 - ax - 2bx + 2ab$$

$$= x^2 - 2bx - ax + 2ab$$
$$= (x^2 - 2bx) - (ax - 2ab)$$
$$= x(x-2b) - a(x-2b)$$
$$= (x-2b)(x-a)$$

$$\therefore x^2 - x(a+2b) + 2ab = (x-2b)(x-a)$$

********** END **********