Exercise 6D

$\left(x^2 + \frac{1}{x^2}\right) = 14$

Squaring both the sides :

$\Rightarrow \left(x^4 + \frac{1}{x^4} + 2(x^2)\left(\frac{1}{x^2}\right)\right) = (14)^2$

$\Rightarrow \left(x^4 + \frac{1}{x^4}\right) + 2 = 196$

$\Rightarrow \left(x^4 + \frac{1}{x^4}\right) = 196 - 2$

$\Rightarrow \left(x^4 + \frac{1}{x^4}\right) = 194$

Therefore, the value of $x^4 + \frac{1}{x^4}$ is 194.

Q12

Answer :

$\left(i\right) \left(x - \frac{1}{x}\right) = 5$

$\Rightarrow$ Squaring both the sides :

$\Rightarrow \left(x - \frac{1}{x}\right)^2 = (5)^2$

$\Rightarrow \left(x^2 + \frac{1}{x^2} - 2(x)\left(\frac{1}{x}\right)\right) = 25$

$\Rightarrow \left(x^2 + \frac{1}{x^2}\right) - 2 = 25$

$\Rightarrow \left(x^2 + \frac{1}{x^2}\right) = 25 + 2$

$\Rightarrow \left(x^2 + \frac{1}{x^2}\right) = 27$

Therefore, the value of $\left(x^2 + \frac{1}{x^2}\right)$ is 27.

$\left(x^2 + \frac{1}{x^2}\right) = 27$

$\Rightarrow$ Squaring both the sides :

$\Rightarrow \left(x^4 + \frac{1}{x^4} - 2(x^2)\left(\frac{1}{x^2}\right)\right) = (27)^2$

$\Rightarrow \left(x^4 + \frac{1}{x^4}\right) - 2 = 729$

$\Rightarrow \left(x^4 + \frac{1}{x^4}\right) = 729 + 2$

$\Rightarrow \left(x^4 + \frac{1}{x^4}\right) = 731$

Therefore, the value of $\left(x^4 + \frac{1}{x^4}\right)$ is 731.

Q13

Answer :

$(i)\ (x+1)(x-1)(x^2+1)$

$\Rightarrow (x^2 - x + x - 1)(x^2+1)$

$\Rightarrow (x^2-1)(x^2+1)$

$\Rightarrow (x^2)^2 - (1^2)^2$ $\left[\text{according to the formula } a^2 - b^2 = (a+b)(a-b)\right]$

$\Rightarrow x^4 - 1.$

Therefore, the product of $(x+1)(x-1)(x^2+1)$ is $x^4 - 1$.

$(ii)\ (x-3)(x+3)(x^2+9)$

$\Rightarrow \left((x)^2 - (3)^2\right)(x^2+9)$ $\left[\text{according to the formula } a^2 - b^2 = (a+b)(a-b)\right]$

$\Rightarrow (x^2-9)(x^2+9)$

$\Rightarrow (x^2)^2 - (9)^2$ $\left[\text{according to the formula } a^2 - b^2 = (a+b)(a-b)\right]$

$\Rightarrow x^4 - 81$

Therefore, the product of $(x-3)(x+3)(x^2+9)$ is $x^4 - 81$.

(iii) $(3x-2y)(3x+2y)(9x^2+4y^2)$

$\Rightarrow \left((3x)^2 - (2y)^2\right)(9x^2+4y^2)$

$\left[\text{according to the formula } a^2 - b^2 = (a+b)(a-b)\right]$

$\Rightarrow (9x^2 - 4y^2)(9x^2+4y^2)$

$\Rightarrow (9x^2)^2 - (4y^2)^2$ $\left[\text{according to the formula } a^2 - b^2 = (a+b)(a-b)\right]$

$\Rightarrow 81x^4 - 16y^4.$

Therefore, the product of $(3x-2y)(3x+2y)(9x^2+4y^2)$ is $81x^4 - 16y^4$.

(iv) $(2p+3)(2p-3)(4p^2+9)$

$\Rightarrow \left((2p)^2 - (3)^2\right)(4p^2+9)$ $\left[\text{according to the formula } a^2 - b^2 = (a+b)(a-b)\right]$

$\Rightarrow (4p^2-9)(4p^2+9)$

$\Rightarrow (4p^2)^2 - (9)^2$ $\left[\text{according to the formula } a^2 - b^2 = (a+b)(a-b)\right]$

$\Rightarrow 16p^4 - 81.$

Therefore, the product of $(2p+3)(2p-3)(4p^2+9)$ is $16p^4 - 81$.

Q14

Answer :

$x + y = 12$

On squaring both the sides :

$\Rightarrow (x+y)^2 = (12)^2$

$\Rightarrow x^2 + y^2 + 2xy = 144$

$\Rightarrow x^2 + y^2 = 144 - 2xy$

Given :

$xy = 14$

$\Rightarrow x^2 + y^2 = 144 - 2(14)$

$\Rightarrow x^2 + y^2 = 144 - 28$

$\Rightarrow x^2 + y^2 = 116$

Therefore, the value of $x^2 + y^2$ is 116.

Q15

Answer :

$x - y = 7$

$\Rightarrow$ On squaring both the sides :

$\Rightarrow (x-y)^2 = (7)^2$

$\Rightarrow x^2 + y^2 - 2xy = 49$

$\Rightarrow x^2 + y^2 = 49 + 2xy$

Given :

$xy = 9$

$\Rightarrow x^2 + y^2 = 49 + 2(9)$

$\Rightarrow x^2 + y^2 = 49 + 18$

$\Rightarrow x^2 + y^2 = 67.$

Therefore, the value of $x^2 + y^2$ *is* 67.

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