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

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 :

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

$\Rightarrow$ 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 :

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

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

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

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

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

Q13

Answer :

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

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

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

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

$\Rightarrow x^4 - 1.$

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

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

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

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

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

$\Rightarrow x^4 - 81$

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

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

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

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

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

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

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

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

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

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

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

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

$\Rightarrow 16p^4 - 81.$

Therefore, the product of $(2p+3)(2p-3)\left(4p^2+9\right)$ 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.

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