Exercise VSAQs   Page No: 4.28

Question 1: If x + 1/x = 3, then find the value of x^2 + 1/x^2.
Solution:
x + 1/x = 3
Squaring both sides, we have
(x + 1/x)^2 = 3^2

x^2 + 1/x^2 + 2 = 9

x^2 + 1/x^2 = 9 – 2 = 7

Question 2: If x + 1/x = 3, then find the value of x^6 + 1/x^6.
Solution:
x + 1/x = 3
Squaring both sides, we have
(x + 1/x)^2 = 3^2

x^2 + 1/x^2 + 2 = 9

x^2 + 1/x^2 = 9 – 2 = 7

x^2 + 1/x^2 = 7 …(1)

Cubing equation (1) both sides,

$$= \left(x^2 + \frac{1}{x^2}\right)^3 = (7)^3$$

$$= x^6 + \frac{1}{x^6} + 3\left(x^2 + \frac{1}{x^2}\right) = 343$$

$$= x^6 + \frac{1}{x^6} + 3 \times 7 = 343$$

$$= x^6 + \frac{1}{x^6} = 322$$

Question 3: If a + b = 7 and ab = 12, find the value of $a^2 + b^2$.
Solution:
a + b = 7, ab = 12
Squaring, a + b = 7, both sides,

$(a + b)^2 = (7)^2$

$a^2 + b^2 + 2ab = 49$

$a^2 + b^2 + 2 \times 12 = 49$

$a^2 + b^2 + 24 = 49$

$a^2 + b^2 = 25$

Question 4: If a – b = 5 and ab = 12, find the value of $a^2 + b^2$.

Solution:

$a – b = 5$, $ab = 12$

Squaring, $a – b = 5$, both sides,

$(a – b)^2 = (5)^2$

$a^2 + b^2 - 2ab = 25$

$a^2 + b^2 - 2 \times 12 = 25$

$a^2 + b^2 - 24 = 25$

$a^2 + b^2 = 49$