Exercise 9.1

1. Find each of the following products using appropriate identities:

(*i*) $(x + 7)(x + 7)$

(*ii*) $(x - 5)(x + 7)$

(*iii*) $(x + 8)(x - 9)$

(*iv*) $\left(x^2 + \frac{5}{2}\right)\left(x^2 - \frac{5}{2}\right)$

2. Evaluate:

(*i*) $(107)^2$

(*ii*) $(996)^2$

3. Evaluate each of the following products without multiplying directly:
   (*i*) 98×103 (*ii*) 204×207 (*iii*) 198×209

4. If $x + \frac{1}{x} = 3$, find the value of $x^4 + \frac{1}{x^4}$.

5. If $x - \frac{1}{2x} = 3$, find the value of $x^2 + \frac{1}{4x^2}$.

6. If $x^2 + \frac{1}{x^2} = 7$, find the values of each of the following:

   (*i*) $x + \frac{1}{x}$ (*ii*) $x - \frac{1}{x}$ (*iii*) $2x^2 - \frac{2}{x^2}$

7. Simplify: $\left(3x - \frac{1}{3x}\right)^2 - \left(3x + \frac{1}{3x}\right)\left(3x - \frac{1}{3x}\right)$.

8. If $x^4 + \frac{16}{x^4} = 56$, find the value of $x - \frac{2}{x}$.

9. If $a + b = 13$, $a - b = 11$, find the value of $a^2 + b^2$.

10. If $3a + 4b = 16$ and $ab = 4$, find the value of $9a^2 + 16b^2$.

Answers

1. (*i*) $x^2 + 14x + 49$ (*ii*) $x^2 + 2x - 35$

(*iii*) $x^2 - x - 72$ (*iv*) $x^4 - \frac{25}{4}$

2. (*i*) 11449 (*ii*) 992016

3. (*i*) 10094 (*ii*) 42228 (*iii*) 41382

4. 47 **5.** 10

6. (*i*) ± 3 (*ii*) $\pm \sqrt{5}$ (*iii*) $\pm 6\sqrt{5}$

7. $2\left(\frac{1}{9x^2} - 1\right)$ **8.** 2 **9.** 145 **10.** 160