Exercise 3.1

Question 1: Simplify each of the following:

(i) $\sqrt[3]{4} \times \sqrt[3]{16}$

(ii) $\frac{\sqrt[4]{1250}}{\sqrt[4]{2}}$

Solution:

(i)

Using: $\sqrt[n]{a} \times \sqrt[n]{b} = \sqrt[n]{a \times b}$

$= \sqrt[3]{4 \times 16}$

$= \sqrt[3]{64}$

$= \sqrt[3]{4^3}$

$= (4^3)^{\frac{1}{3}}$

$= 4$

(ii)

(Note: $\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$)

$= \sqrt[4]{\frac{1250}{2}}$

$= \sqrt[4]{\frac{2 \times 625}{2}}$

$= \sqrt[4]{625}$

$= \sqrt[4]{15^4}$

$= 15^{(4 \times \frac{1}{4})}$

$= 15$

Question 2: Simplify the following expressions:

(i) (4 + √7) (3 + √2)

(ii) (3 + √3)(5- √2)

(iii) (√5 -2)(√3 – √5)

Solution:

(i) (4 + √7) (3 + √2)
= 12 + 4√2 + 3√7 + √14

(ii) (3 + √3)(5- √2)
= 15 - 3√2 + 5√3 - √6

(iii) (√5 -2)(√3 – √5)
= √15 - √25 - 2√3 + 2√5
= √15 - 5 - 2√3 + 2√5

Question 3: Simplify the following expressions:
(i) (11 + √11) (11 – √11)
(ii) (5 + √7) (5 –√7)
(iii) (√8 – √2) (√8 + √2)
(iv) (3 + √3) (3 - √3)
(v) (√5 - √2) (√5 + √2)

Solution:
Using Identity: (a – b)(a+b) = a^2 – b^2
(i) (11 + √11) (11 – √11)
= 11^2 – (√11)^2
= 121 – 11
= 110
(ii) (5 + √7) (5 –√7)
= (5^2 – (√7)^2)
= 25 – 7 = 18
(iii) (√8 – √2) (√8 + √2)
= (√8)^2 – (√2) ^2
= 8 -2
= 6
(iv) (3 + √3) (3 - √3)
= (3)^2 – (√3)^2
= 9 – 3
= 6
(v) (√5 - √2) (√5 + √2)
=(√5)^2 - (√2)^2
= 5 – 2
= 3

Solutions for Class 9 Maths Chapter 3 Rationalisation

Question 4: Simplify the following expressions:
(i) $(\sqrt{3} + \sqrt{7})^2$
(ii) $(\sqrt{5} – \sqrt{3})^2$
(iii) $(2\sqrt{5} + 3\sqrt{2})^2$
Solution:
Using identities: (a – b)^2 = a^2 + b^2 – 2ab and (a + b)^2 = a^2 + b^2 + 2ab

(i) $(\sqrt{3} + \sqrt{7})^2$
= $(\sqrt{3})^2 + (\sqrt{7})^2 + 2(\sqrt{3})(\sqrt{7})$
= 3 + 7 + 2√21
= 10 + 2√21

(ii) $(\sqrt{5} – \sqrt{3})^2$
= $(\sqrt{5})^2 + (\sqrt{3})^2 - 2(\sqrt{5})(\sqrt{3})$

= 5 + 3 - 2√15
= 8 - 2√15

(iii) $(2\sqrt{5} + 3\sqrt{2})^2$

= $(2\sqrt{5})^2 + (3\sqrt{2})^2 + 2(2\sqrt{5})(3\sqrt{2})$

= 20 + 18 + 12√10

= 38 + 12√10