

# Mathematics

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(Chapter – 1) (Number Systems)(Exemplar Problems)

(Class – IX)

## Exercise 1.4

### Question 2:

Simplify:  $\frac{7\sqrt{3}}{\sqrt{10+\sqrt{3}}} - \frac{2\sqrt{5}}{\sqrt{6+\sqrt{5}}} - \frac{3\sqrt{2}}{\sqrt{15+3\sqrt{2}}}$

### Answer 2:

Given that:

$$\frac{7\sqrt{3}}{\sqrt{10+\sqrt{3}}} - \frac{2\sqrt{5}}{\sqrt{6+\sqrt{5}}} - \frac{3\sqrt{2}}{\sqrt{15+3\sqrt{2}}}$$

$$= \frac{7\sqrt{3}}{\sqrt{10+\sqrt{3}}} \times \frac{\sqrt{10}-\sqrt{3}}{\sqrt{10}-\sqrt{3}} - \frac{2\sqrt{5}}{\sqrt{6+\sqrt{5}}} \times \frac{\sqrt{6}-\sqrt{5}}{\sqrt{6}-\sqrt{5}} - \frac{3\sqrt{2}}{\sqrt{15+3\sqrt{2}}} \times \frac{\sqrt{15}-3\sqrt{2}}{\sqrt{15}-3\sqrt{2}}$$

$$= \frac{7\sqrt{3}(\sqrt{10}-\sqrt{3})}{(\sqrt{10})^2 - (\sqrt{3})^2} - \frac{2\sqrt{5}(\sqrt{6}-\sqrt{5})}{(\sqrt{6})^2 - (\sqrt{5})^2} - \frac{3\sqrt{2}(\sqrt{15}-3\sqrt{2})}{(\sqrt{15})^2 - (3\sqrt{2})^2}$$

$$= \frac{7\sqrt{30} - 7 \times 3}{10 - 3} - \frac{2\sqrt{30} - 2 \times 5}{6 - 5} - \frac{3\sqrt{30} - 9 \times 2}{15 - 18}$$

$$= \frac{7(\sqrt{30} - 3)}{7} - \frac{2\sqrt{30} - 10}{1} - \frac{3(\sqrt{30} - 6)}{-3}$$

$$= (\sqrt{30} - 3) - (2\sqrt{30} - 10) + (\sqrt{30} - 6)$$

$$= \sqrt{30} - 3 - 2\sqrt{30} + 10 + \sqrt{30} - 6 = 1$$

