

IX Homework-2

No.

Date

1) Simplify : $(3\sqrt{5} - 5\sqrt{2})(4\sqrt{5} + 3\sqrt{2})$

2) Find the value of a and b if $\frac{\sqrt{2} + \sqrt{3}}{3\sqrt{2} - 2\sqrt{3}} = 2 - b\sqrt{6}$

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

4) If $\sqrt{2} = 1.414$, $\sqrt{3} = 1.732$, then evaluate $\frac{4}{3\sqrt{3} - 2\sqrt{2}} + \frac{3}{3\sqrt{3} + 2\sqrt{2}}$

5) Prove that $\frac{1}{2 + \sqrt{5}} + \frac{1}{\sqrt{5} + \sqrt{6}} + \frac{1}{\sqrt{6} + \sqrt{7}} + \frac{1}{\sqrt{7} + \sqrt{8}} = -2 + \sqrt{8}$

MCRQs

- 1) $2\sqrt{3} + \sqrt{3} =$ (a) $2\sqrt{6}$ (b) 6 (c) $3\sqrt{3}$ (d) $4\sqrt{6}$
- 2) $\sqrt{10} \times \sqrt{15} =$ (a) $6\sqrt{5}$ (b) $5\sqrt{6}$ (c) $\sqrt{25}$ (d) $10\sqrt{5}$
- 3) The number obtained on rationalising the denominator of $\frac{1}{\sqrt{7}-2} =$ (a) $\frac{\sqrt{7}+2}{3}$ (b) $\frac{\sqrt{7}-2}{3}$ (c) $\frac{\sqrt{7}+2}{5}$ (d) $\frac{\sqrt{7}+2}{45}$
- 4) $\frac{1}{\sqrt{9}-\sqrt{8}} =$ (a) $\frac{1}{2}(3-2\sqrt{2})$ (b) $\frac{1}{3+2\sqrt{2}}$ (c) $3-2\sqrt{2}$ (d) $3+2\sqrt{2}$
- 5) After rationalising the denominator of $\frac{7}{3\sqrt{3}-2\sqrt{2}}$, we get the denominator as (a) 13 (b) 19 (c) 5 (d) 35
- 6) The value of $\frac{\sqrt{32} + \sqrt{48}}{\sqrt{8} + \sqrt{12}} =$ (a) $\sqrt{2}$ (b) 2 (c) 4 (d) 8
- 7) If $\sqrt{2} = 1.4142$, then $\frac{\sqrt{2}-1}{\sqrt{2}+1} =$ (a) 2.4142 (b) 0.8282 (c) 0.4142 (d) 0.1718
- 8) The smallest rational number by which $\frac{1}{3}$ should be multiplied so that its decimal expansion terminates after one place of decimal is (a) $\frac{1}{10}$ (b) $\frac{3}{10}$ (c) 3 (d) 30
- 9) If $\sqrt{2} = 1.414$; $\sqrt{3} = 1.732$, then $\sqrt{5-2\sqrt{6}} =$ (a) 0.318 (b) 0.316 (c) 0.381 (d) 0.312
- 10) The rationalising factor of $\frac{1}{\sqrt{9}-\sqrt{7}}$ is (a) $\sqrt{9}+7$ (b) $9+\sqrt{7}$ (c) $3+\sqrt{7}$ (d) $3-\sqrt{7}$
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Homework - 2

$$\begin{aligned} 1) & (3\sqrt{5} - 5\sqrt{2})(4\sqrt{5} + 3\sqrt{2}) \\ &= (3\sqrt{5} \times 4\sqrt{5}) + (3\sqrt{5} \times 3\sqrt{2}) - (5\sqrt{2} \times 4\sqrt{5}) \\ & \quad - (5\sqrt{2} \times 3\sqrt{2}) \\ &= 12 \times 5 + 9 \times \sqrt{10} - 20 \times \sqrt{10} - 15 \times 2 \\ &= 60 + 9\sqrt{10} - 20\sqrt{10} - 30 \\ &= \underline{\underline{30 - 11\sqrt{10}}} \end{aligned}$$

$$\begin{aligned} 2) & \frac{\sqrt{2} + \sqrt{3}}{3\sqrt{2} - 2\sqrt{3}} = \frac{(\sqrt{2} + \sqrt{3})(3\sqrt{2} + 2\sqrt{3})}{(3\sqrt{2} - 2\sqrt{3})(3\sqrt{2} + 2\sqrt{3})} \\ &= \frac{3 \times 2 + 2\sqrt{6} + 3\sqrt{6} + 2 \times 3}{(3\sqrt{2})^2 - (2\sqrt{3})^2} \\ &= \frac{6 + 5\sqrt{6} + 6}{18 - 12} = \frac{12 + 5\sqrt{6}}{6} \\ &= \frac{12}{6} + \frac{5\sqrt{6}}{6} \\ &= 2 + \frac{5}{6}\sqrt{6} \\ \therefore b &= \underline{\underline{-\frac{5}{6}}} \end{aligned}$$

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

$$\frac{7\sqrt{3}(\sqrt{10}-\sqrt{3})}{(\sqrt{10}+\sqrt{3})(\sqrt{10}-\sqrt{3})} = \frac{7\sqrt{3}(\sqrt{10}-\sqrt{3})}{10-3} = \frac{7\sqrt{3}(\sqrt{10}-\sqrt{3})}{7} = \underline{\underline{\sqrt{3}(\sqrt{10}-\sqrt{3})}}$$

$$\frac{2\sqrt{5}(\sqrt{6}-\sqrt{5})}{(\sqrt{6}+\sqrt{5})(\sqrt{6}-\sqrt{5})} = \frac{2\sqrt{5}(\sqrt{6}-\sqrt{5})}{6-5} = \underline{\underline{2\sqrt{5}(\sqrt{6}-\sqrt{5})}}$$

$$\frac{3\sqrt{2}(\sqrt{15}-3\sqrt{2})}{(\sqrt{15}+3\sqrt{2})(\sqrt{15}-3\sqrt{2})} = \frac{3\sqrt{2}(\sqrt{15}-3\sqrt{2})}{15-18} = \frac{3\sqrt{2}(\sqrt{15}-3\sqrt{2})}{-3} = \underline{\underline{-\sqrt{2}(\sqrt{15}-3\sqrt{2})}}$$

$$\begin{aligned} \therefore & \sqrt{3}(\sqrt{10}-\sqrt{3}) - 2\sqrt{5}(\sqrt{6}-\sqrt{5}) + \sqrt{2}(\sqrt{15}-3\sqrt{2}) \\ &= \sqrt{30} - 3 - 2\sqrt{30} + 10 + \sqrt{30} - 6 \\ &= \cancel{2\sqrt{30}} - \cancel{2\sqrt{30}} + 10 - 9 \\ &= \underline{\underline{1}} \end{aligned}$$

$$\begin{aligned} \text{H)} \quad \frac{4}{3\sqrt{3}-2\sqrt{2}} &= \frac{4(3\sqrt{3}+2\sqrt{2})}{(3\sqrt{3})^2 - (2\sqrt{2})^2} \\ &= \frac{4(3\sqrt{3}+2\sqrt{2})}{27-8} = \frac{4(3\sqrt{3}+2\sqrt{2})}{19} \\ \frac{3}{3\sqrt{3}+2\sqrt{2}} &= \frac{3(3\sqrt{3}-2\sqrt{2})}{(3\sqrt{3})^2 - (2\sqrt{2})^2} = \frac{3(3\sqrt{3}-2\sqrt{2})}{27-8} \\ &= \frac{3(3\sqrt{3}-2\sqrt{2})}{19} \end{aligned}$$

$$\begin{aligned} \therefore & \frac{4(3\sqrt{3}+2\sqrt{2})}{19} + \frac{3(3\sqrt{3}-2\sqrt{2})}{19} \\ &= \frac{12\sqrt{3} + 8\sqrt{2} + 9\sqrt{3} - 6\sqrt{2}}{19} = \frac{21\sqrt{3} + 2\sqrt{2}}{19} \\ &= \frac{21 \times 1.732 + 2 \times 1.414}{19} \end{aligned}$$

$$= \frac{36.372 + 2.828}{19} = \frac{39.2}{19} \approx \underline{\underline{2.063}}$$

5) ^{LHS,} $\frac{1}{\sqrt{5}+2} + \frac{1}{\sqrt{6}+\sqrt{5}} + \frac{1}{\sqrt{7}+\sqrt{6}} + \frac{1}{\sqrt{8}+\sqrt{7}}$

$$= \frac{\sqrt{5}-2}{5-4} + \frac{\sqrt{6}-\sqrt{5}}{6-5} + \frac{\sqrt{7}-\sqrt{6}}{7-6} + \frac{\sqrt{8}-\sqrt{7}}{8-7}$$

$$= \sqrt{5}-2 + \sqrt{6}-\sqrt{5} + \sqrt{7}-\sqrt{6} + \sqrt{8}-\sqrt{7}$$

$$= \underline{\underline{-2 + \sqrt{8}}}, \text{ RHS}$$

MQs

1) $2\sqrt{3} + \sqrt{3} = 3\sqrt{3}$ (c)

2) $\sqrt{10} \times \sqrt{15} = \sqrt{2} \times \sqrt{5} \times \sqrt{3} \times \sqrt{5}$
 $= 5\sqrt{6}$ (b)

3) $\frac{1}{\sqrt{7}-2} = \frac{\sqrt{7}+2}{7-4} = \frac{\sqrt{7}+2}{3}$ (a)

4) $\frac{1}{\sqrt{9}-\sqrt{8}} = \frac{\sqrt{9}+\sqrt{8}}{9-8} = \sqrt{9}+\sqrt{8} = 3+2\sqrt{2}$ (a)

5) $\frac{7}{3\sqrt{3}-2\sqrt{2}} = \frac{7(3\sqrt{3}+2\sqrt{2})}{27-8} = \frac{7(3\sqrt{3}+2\sqrt{2})}{19}$ (b)

6) $\frac{4\sqrt{2}+4\sqrt{3}}{2\sqrt{2}+2\sqrt{3}} = \frac{4(\sqrt{2}+\sqrt{3})}{2(\sqrt{2}+\sqrt{3})}$, $\begin{array}{r} 2\overline{)32} \quad 2\overline{)48} \\ 2\overline{)16} \quad 2\overline{)24} \\ 2\overline{)8} \quad 2\overline{)12} \\ 2\overline{)4} \quad 2\overline{)6} \\ 2 \quad 3 \end{array}$
 $= \frac{4}{2} = 2$ (b)

7) $\sqrt{\frac{\sqrt{2}-1}{\sqrt{2}+1}} = \sqrt{\frac{(\sqrt{2}-1)^2}{2-1}} = \sqrt{(\sqrt{2}-1)^2} = \sqrt{2}-1$
 $= 1.4142-1$
 $= 0.4142$ (c)

$$8) \frac{1}{3} \times \left(\frac{3}{10}\right) = \frac{1}{10} = 0.1 \quad (b)$$

$$\begin{aligned} 9) \sqrt{5-2\sqrt{6}} &= \sqrt{3+2-2\sqrt{6}} \\ &= \sqrt{(\sqrt{3})^2 + (\sqrt{2})^2 - 2\sqrt{3}\sqrt{2}} \\ &= \sqrt{(\sqrt{3}-\sqrt{2})^2} = \sqrt{3}-\sqrt{2} \\ &= 1.732 - 1.414 \\ &= \underline{\underline{0.318}} \quad (a) \end{aligned}$$

$$10) \sqrt{9} + \sqrt{7} = 3 + \sqrt{7} \quad (c)$$
