

ex. 1.3 exemplar problems E-CH1-P13

$$10 \text{ (v)} \quad \frac{2+\sqrt{3}}{2-\sqrt{3}} \times \frac{2+\sqrt{3}}{2-\sqrt{3}}$$

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

$$= \frac{4+3+4\sqrt{3}}{4-3}$$

$$= \frac{7+4\sqrt{3}}{1}$$

$$10 \text{ (vi)} \quad \frac{\sqrt{6}}{\sqrt{2}+\sqrt{3}}$$

$$= \frac{\sqrt{6}}{\sqrt{2}+\sqrt{3}} \times \frac{\sqrt{2}-\sqrt{3}}{\sqrt{2}-\sqrt{3}}$$

$$= \frac{\sqrt{12}-\sqrt{18}}{(\sqrt{2})^2 - (\sqrt{3})^2}$$

$$= \frac{\sqrt{2 \times 2 \times 3} - \sqrt{3 \times 3 \times 2}}{2-3}$$

$$= \frac{2\sqrt{3} - 3\sqrt{2}}{-1}$$

$$= 3\sqrt{2} - 2\sqrt{3}$$

$$10 \text{ (vii)} \quad \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} \times \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}}$$

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

$$= \frac{3+2+2\sqrt{6}}{3-2}$$

$$= \frac{5+2\sqrt{6}}{1}$$

$$10 \text{ (viii)} \quad \frac{3\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} \times \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}}$$

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

$$= \frac{3\sqrt{5} \times 5 + 3\sqrt{5} \times 3 + \sqrt{3} \times 5 + \sqrt{3} \times 3}{5-3}$$

$$= \frac{3 \times 5 + 3\sqrt{15} + \sqrt{15} + 3}{2}$$

$$= \frac{18 + 4\sqrt{15}}{2}$$

$$= \frac{2(9 + 2\sqrt{15})}{2}$$

$$= 9 + 2\sqrt{15}$$

$$10 \text{ (ix)} \quad \frac{4\sqrt{3}+5\sqrt{2}}{\sqrt{48}+\sqrt{18}}$$

$$= \frac{4\sqrt{3}+5\sqrt{2}}{\sqrt{4 \times 4 \times 3} - \sqrt{3 \times 3 \times 2}}$$

$$= \frac{4\sqrt{3}+5\sqrt{2}}{4\sqrt{3}-3\sqrt{2}} \times \frac{4\sqrt{3}-3\sqrt{2}}{4\sqrt{3}-3\sqrt{2}}$$

$$= \frac{16\sqrt{3} \times 3 - 12\sqrt{3} \times 2 + 20\sqrt{2} \times 3 - 15\sqrt{2} \times 2}{(4\sqrt{3})^2 - (3\sqrt{2})^2}$$

$$= \frac{48 - 12\sqrt{6} + 20\sqrt{6} - 30}{48 - 18}$$

$$= \frac{18 + 8\sqrt{6}}{30} = \frac{2(9 + 4\sqrt{6})}{30 \div 15}$$