

$$(12) \quad a = 2 + \sqrt{3}$$

$$\frac{1}{a} = \frac{1}{2 + \sqrt{3}} \times \frac{2 - \sqrt{3}}{2 - \sqrt{3}}$$

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

$$= \frac{2 - \sqrt{3}}{4 - 3}$$

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

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

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

$$= 2\sqrt{3}$$

$$13(i) \quad \frac{4}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$$

$$= \frac{4\sqrt{3}}{\sqrt{3} \times 3}$$

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

$$= \frac{4}{3} \times 1.732$$

$$= \frac{6.928}{3}$$

$$= 2.309$$

$$13(ii) \quad \frac{6}{\sqrt{6}}$$

$$= \frac{6}{\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}}$$

$$= \frac{\cancel{6}\sqrt{6}}{\cancel{6}}$$

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

$$= 1.414 \times 1.732$$

$$= 2.449$$

$$13(iii) \quad \frac{\sqrt{10} - \sqrt{5}}{2}$$

$$= \frac{\sqrt{5}(\sqrt{2} - 1)}{2}$$

$$= \frac{1.118 \times 2.236 (1.414 - 1)}{2}$$

$$= 1.118 \times 0.414$$

$$= 0.463$$

$$13(iv) \quad \frac{\sqrt{2}}{2 + \sqrt{2}} \times \frac{2 - \sqrt{2}}{2 - \sqrt{2}}$$

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

$$= \frac{2\sqrt{2} - 2}{4 - 2}$$

$$= \frac{\cancel{2}(\sqrt{2} - 1)}{\cancel{2}}$$

$$= 1.414 - 1$$

$$= 0.414$$