$(\sqrt{a})^2 = a$ $\qquad$ $\sqrt{a}\sqrt{b} = \sqrt{ab}$

$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$ $\qquad$ $(\sqrt{a}+\sqrt{b})(\sqrt{a}-\sqrt{b}) = a-b$

$(a+\sqrt{b})(a-\sqrt{b}) = a^2-b$

$(\sqrt{a} \pm \sqrt{b})^2 = a \pm 2\sqrt{ab} + b$

$(\sqrt{a}+\sqrt{b})(\sqrt{c}+\sqrt{d}) = \sqrt{ac}+\sqrt{bc}+\sqrt{ad}+\sqrt{bd}$

(1) Rationalise the denominator :—

$$\frac{1}{\sqrt{12}}, \quad \frac{\sqrt{3}+1}{\sqrt{2}}, \quad \frac{\sqrt{2}+\sqrt{5}}{\sqrt{3}}$$

(2) If $\sqrt{2} = 1.414$, $\sqrt{3} = 1.732$, $\sqrt{10} = 3.162$, $\sqrt{5} = 2.236$ (approximately), find the value of

$$\frac{\sqrt{2}+1}{5}, \quad \frac{2-\sqrt{3}}{\sqrt{3}}, \quad \frac{\sqrt{10}-\sqrt{5}}{\sqrt{2}}$$

(3) Rationalise the denominator and simplify :-

$$\frac{4\sqrt{3}+5\sqrt{2}}{\sqrt{48}+\sqrt{18}}, \quad \frac{3\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}, \quad \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$$

(4) In each of the following determine rational numbers 'a' and 'b' :—

(a) $\frac{5+2\sqrt{3}}{7+4\sqrt{3}} = a+b\sqrt{3}$; (b) $\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} = a+b\sqrt{15}$

(c) $\frac{\sqrt{2}+\sqrt{3}}{3\sqrt{2}-2\sqrt{3}} = a-b\sqrt{6}$

(d) $\frac{3-\sqrt{5}}{3+2\sqrt{5}} = a\sqrt{5}+b$

(5) If $a = \frac{3+\sqrt{5}}{2}$, then find the value of $a^2+\frac{1}{a^2}$.

(6) $a = 5+2\sqrt{6}$ and $b = \frac{1}{a}$, then find the value of a^2+b^2.

(7) If $\frac{6}{3\sqrt{2}-2\sqrt{3}} = 3\sqrt{2}-a\sqrt{3}$, find the value of a.