

$$\textcircled{1} (\sqrt{3+\sqrt{5}} + \sqrt{3-\sqrt{5}})^2 =$$

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

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

$$6 + 2\sqrt{9-5} =$$

$$6 + 2\sqrt{4} = 6 + 2 \cdot 2 = \underline{\underline{10}}$$

$$\textcircled{2} \frac{\sqrt{15} + \sqrt{10}}{\sqrt{15} - \sqrt{10}} \cdot \frac{\sqrt{15} + \sqrt{10}}{\sqrt{15} + \sqrt{10}} = \frac{15 + 2\sqrt{15} \cdot \sqrt{10} + 10}{15 - 10}$$

$$= \frac{25 + 2\sqrt{150}}{5}$$

$$= 5 + 2\sqrt{\frac{150}{25}} = 5 + 2\sqrt{6}$$

$$= \underline{\underline{5 + 2\sqrt{6}}}$$

$$\textcircled{3} \sqrt{3} + \sqrt{12} + \sqrt{18} = \sqrt{2} + \sqrt{8} + \sqrt{27}$$

$$\sqrt{3} + \sqrt{3 \cdot 4} + \sqrt{2 \cdot 9} = \sqrt{2} + \sqrt{4} + \sqrt{3 \cdot 9}$$

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

$$3\sqrt{3} + 3\sqrt{2} = 3\sqrt{2} + 3\sqrt{3} \quad \text{[OK]}$$

$$\textcircled{4} \sqrt{\left(\frac{4+v}{2}\right)^2 - 4v} = \sqrt{\frac{4^2 + 2 \cdot 4v + v^2 - 4 \cdot 4v}{4}} = \sqrt{\frac{4^2 - 2 \cdot 4v + v^2}{4}}$$

$$= \underline{\underline{\frac{(4-v)^2}{4}}}$$

$$\textcircled{5} \left(\sqrt{x+1} + \sqrt{\frac{1}{x}} \right)^2 =$$

$$x + 2\sqrt{x+1}\sqrt{\frac{1}{x}} + \frac{1}{x} = x + 2 + \frac{1}{x} = \frac{x^2 + 2x + 1}{x}$$

$$= \frac{(x+1)^2}{x}$$

$$\textcircled{6} \sqrt{x + \left(\frac{4-x}{2}\right)^2} - \sqrt{\left(\frac{x+4}{2}\right)^2 - 1} =$$

$$\sqrt{\frac{4 + x^2 - 2 + \frac{1}{x^2}}{4}} = \sqrt{\frac{x^2 + 2 + \frac{1}{x^2} - 4}{4}} =$$

$$\sqrt{\frac{x^2 + 2 + \frac{1}{x^2}}{4}} - \sqrt{\frac{x^2 - 2 + \frac{1}{x^2}}{4}} =$$

$$\frac{x + \frac{1}{x}}{2} - \frac{x - \frac{1}{x}}{2} =$$

$$\frac{x + \frac{1}{x} - x + \frac{1}{x}}{2} = \frac{1}{4}$$