

$$1) \frac{5}{2-\sqrt[3]{3}} = \frac{5(4+2\sqrt[3]{3}+\sqrt[3]{9})}{(2-\sqrt[3]{3})(4+2\sqrt[3]{3}+\sqrt[3]{9})} = \frac{5(4+2\sqrt[3]{3}+\sqrt[3]{9})}{2^3-(\sqrt[3]{3})^3} =$$

$$= \frac{5(4+2\sqrt[3]{3}+\sqrt[3]{9})}{8-3} = \frac{5(4+2\sqrt[3]{3}+\sqrt[3]{9})}{5} =$$

$$= 4+2\sqrt[3]{3}+\sqrt[3]{9}.$$

$$2) a) \frac{\sin^2 34^\circ - \cos^2 26^\circ}{\sin^2 82^\circ} = \frac{\frac{1-\cos 68^\circ}{2} - \frac{1+\cos 52^\circ}{2}}{\sin^2 82^\circ} =$$

$$= \frac{-\frac{(\cos 68^\circ + \cos 52^\circ)}{2}}{\sin^2(90^\circ - 8^\circ)} = \frac{-2 \cos \frac{120^\circ}{2} \cos \frac{16^\circ}{2}}{\cos^2 8^\circ} = \frac{\cos 60^\circ \cos 8^\circ}{\cos^2 8^\circ} =$$

$$= \frac{1}{2}; \cos 8^\circ = \frac{1}{2 \cos 8^\circ}$$

$$b) \cos 75^\circ = \cos(45^\circ + 30^\circ) = \cos 45^\circ \cos 30^\circ - \sin 45^\circ \sin 30^\circ =$$

$$= \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2} = \frac{\sqrt{2}}{2} \left( \frac{\sqrt{3}}{2} - \frac{1}{2} \right) = \frac{\sqrt{2}(\sqrt{3}-1)}{4};$$

$$3) \sqrt{x-1} + \sqrt{x+2} = 3$$

$$x-1 + \sqrt{x+2} = 9$$

$$\sqrt{x+2} = 9+1-x$$

$$\sqrt{x+2} = 10-x$$

$$x+2 = 100-20x+x^2$$

$$x^2 - 21x + 98 = 0$$

$$D = 441 - 392 = 49$$

$$x_1 = \frac{21+7}{2} = 14; \quad x_2 = \frac{21-7}{2} = 7$$

Проверка:  $\sqrt{14-1} + \sqrt{14+2} = 3$

$$x=14$$

$$\sqrt{14-1} + 4 = 3$$

$$\sqrt{17} = 3 \text{ не верно}$$

$$\sqrt{7-1} + \sqrt{7+2} = 3$$

$$\sqrt{6+3} = 3 \text{ верно.}$$

Ответ: 7.