

1. Να υπολογιστούν οι παραστάσεις:

$$\sqrt{2} + \sqrt{8} - \sqrt{18} + \sqrt{50} =$$

$$3\sqrt{12} + 4\sqrt{27} - 2\sqrt{75} + 2\sqrt{3} =$$

$$3\sqrt{8} + 4\sqrt{18} + 3\sqrt{72} - 4\sqrt{200} =$$

$$3\sqrt{\frac{3}{16}} - \frac{3}{4}\sqrt{27} + 5\sqrt{\frac{48}{64}} =$$

$$\sqrt{243} + \sqrt{48} - \sqrt{768} + \sqrt{27} =$$

$$3\sqrt{8} - 7\sqrt{18} + 9\sqrt{162} - 12\sqrt{50} =$$

2. Να γίνουν οι πράξεις:

$$(\sqrt{2} + 2\sqrt{32} + 4\sqrt{8} - \sqrt{50})\sqrt{2} =$$

$$(\sqrt{3} + \sqrt{6})(\sqrt{3} + \sqrt{7}) =$$

$$(x - \alpha + \sqrt{\beta + \alpha^2})(x - \alpha - \sqrt{\beta + \alpha^2}) =$$

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

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

3. Αν

$$\alpha = \sqrt{2 + \sqrt{2 + \sqrt{3}}}, \beta = \sqrt{2 + \sqrt{3}}, \gamma = \sqrt{2 - \sqrt{2 + \sqrt{3}}}$$

ναδειχτεί ότι $\alpha \cdot \beta \cdot \gamma = 1$.

4. Να απλοποιηθεί το κλάσμα:

$$\frac{3\sqrt{8} - 2\sqrt{12} + \sqrt{20}}{3\sqrt{18} - 2\sqrt{27} + \sqrt{45}} =$$

5. Να γίνουν οι πράξεις:

$$\left(\sqrt[3]{\alpha} + \sqrt[3]{\beta}\right)\left(\sqrt[3]{\alpha^2} - \sqrt[3]{\alpha\beta} + \sqrt[3]{\beta^2}\right) =$$

6. Τα παρακάτω κλάσματα να τραπούν σε ισοδύναμα με ρητό παρονομαστή:

$$\frac{1}{\sqrt{3}}, \quad \frac{1}{\sqrt{2}}, \quad \frac{3}{\sqrt{3}}, \quad \frac{2}{\sqrt{2}}$$

$$\frac{2}{\sqrt{3} - 2}, \quad \frac{5}{5 - \sqrt{3}}, \quad \frac{\sqrt{30}}{\sqrt{5} - \sqrt{3} + \sqrt{2}}$$

$$\frac{\beta\sqrt{\beta} - \alpha\sqrt{\alpha}}{\sqrt{\beta} - \sqrt{\alpha}} =$$

$$\alpha \neq \beta$$

$$\frac{\sqrt{\alpha} - \sqrt{\beta}}{\alpha\sqrt{\beta} - \beta\sqrt{\alpha}} =$$

$$\alpha \neq \beta$$

$$\frac{\beta + \alpha}{\sqrt{\alpha} - \beta} = \frac{2}{\sqrt[3]{5} + \sqrt[3]{3}} = \frac{1}{\sqrt[3]{4} + \sqrt[3]{3}} = \frac{1}{\sqrt[3]{2} + \sqrt[3]{3}} =$$

7. Να γίνουν οι πράξεις:

$$(\sqrt{2} + \sqrt{3} + \sqrt{5})(\sqrt{2} - \sqrt{3} + \sqrt{5})(-2 + \sqrt{10}) =$$

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

$$\frac{2}{\sqrt{3} - \sqrt{2}} - \frac{3}{3\sqrt{2} - 2\sqrt{3}} - \frac{5}{2\sqrt{3} - \sqrt{2}} =$$

8. Να απλοποιήσετε τις παραστάσεις:

$$\sqrt{7 - 4\sqrt{3}} =$$

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

$$\sqrt{7 + 4\sqrt{3}} - \sqrt{4 - 2\sqrt{3}} =$$

$$\sqrt{\alpha^2 + \beta + 2\alpha\sqrt{\beta}} =$$

$$\frac{1}{\sqrt{2} + \sqrt{3} + \sqrt{5}} =$$

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

$$\frac{\sqrt{\sqrt{\alpha} - \sqrt{\beta}}}{\sqrt{\sqrt{\alpha} + \sqrt{\beta}}} =$$

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

9. Να δείξετε ότι:

$$\frac{1}{7 + 4\sqrt{3}} + \frac{1}{7 - 4\sqrt{3}} = 14$$

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