

$$\begin{aligned}
 1. \quad \frac{\sqrt[2]{2 \cdot 3 \cdot 4}}{\sqrt[3]{2 \cdot \sqrt{8}}} &= \frac{2 \cdot 3 \sqrt[2]{2 \cdot 4}}{\sqrt[3]{2 \cdot 2 \sqrt{2^3}}} \\
 &= \frac{6\sqrt{2^5}}{\sqrt[3]{2 \cdot 2 \sqrt{2^3}}} \\
 &= \frac{2^6}{2^3 \cdot 2^2} \\
 &= \frac{2^6}{2^6} \\
 &= \frac{11}{2^6} \\
 &= 2^{-1} = \frac{1}{2}
 \end{aligned}$$

Cevap: E

$$\begin{aligned}
 2. \quad (\sqrt{2} - \sqrt{5})^3 &= (\sqrt{2})^3 - 3(\sqrt{2})^2 \cdot \sqrt{5} + 3 \cdot \sqrt{2} \cdot (\sqrt{5})^2 - (\sqrt{5})^3 \\
 &= 2\sqrt{2} - 3 \cdot 2 \cdot \sqrt{5} + 3 \cdot 5 \cdot \sqrt{2} - 5\sqrt{5} \\
 &= 2\sqrt{2} - 6\sqrt{5} + 15\sqrt{2} - 5\sqrt{5} \\
 &= 17\sqrt{2} - 11\sqrt{5}
 \end{aligned}$$

Cevap: B

$$\begin{aligned}
 3. \quad x \in \mathbb{R}^+ \\
 \frac{\sqrt[4]{x^3} \cdot \sqrt[3]{x^4}}{\sqrt[12]{x^{24}}} &= \frac{x^{\frac{3}{4}} \cdot x^{\frac{4}{3}}}{x^{\frac{24}{12}}} \\
 &= \frac{x^{\frac{3}{4} + \frac{4}{3}}}{x^2} \\
 &= \frac{x^{\frac{25}{12}}}{x^2} \\
 &= x^{\frac{25}{12} - 2} \\
 &= x^{\frac{1}{12}} = \sqrt[12]{x}
 \end{aligned}$$

Cevap: D

$$\begin{aligned}
 4. \quad \frac{(3\sqrt{2})^2 - (2\sqrt{3})^2}{2^{\frac{3}{2}} - 2^{\frac{1}{2}}} &= \frac{9 \cdot 2 - 4 \cdot 3}{\sqrt{2^3} - \sqrt{2}} \\
 &= \frac{18 - 12}{\sqrt{8} - \sqrt{2}} \\
 &= \frac{6}{2\sqrt{2} - \sqrt{2}} \\
 &= \frac{6}{\sqrt{2}} \\
 &= \frac{6\sqrt{2}}{2} = 3\sqrt{2}
 \end{aligned}$$

Cevap: E

$$5. \quad \sqrt{4 + \sqrt{7}} - \sqrt{4 - \sqrt{7}} = x \text{ olsun.}$$

Eşitliğin her iki tarafının karesini alalım.

$$(\sqrt{4 + \sqrt{7}} - \sqrt{4 - \sqrt{7}})^2 = x^2$$

$$4 + \sqrt{7} - 2 \cdot \sqrt{(4 + \sqrt{7}) \cdot (4 - \sqrt{7})} + 4 - \sqrt{7} = x^2$$

İki kare farkı

$$8 - 2 \cdot \sqrt{4^2 - (\sqrt{7})^2} = 8 - 2 \cdot \sqrt{16 - 7} = 8 - 2 \cdot \sqrt{9}$$

$$= 8 - 2 \cdot 3$$

$$= 8 - 6 = 2 = x^2$$

$$\Rightarrow x = \sqrt{2}$$

Cevap: D

$$\begin{aligned}
 6. \quad \sqrt{13 - 2\sqrt{30}} + \sqrt{5 - 2\sqrt{6}} + \sqrt{2} \\
 \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\
 10+3 \quad 10 \cdot 3 \quad 3+2 \quad 3 \cdot 2 \\
 = \sqrt{10} - \sqrt{3} + \sqrt{3} - \sqrt{2} + \sqrt{2} = \sqrt{10}
 \end{aligned}$$

Cevap: A

$$7. \frac{\sqrt{3,61} + \sqrt{1,69}}{\sqrt{1,44} - \sqrt{0,64}} = \frac{\sqrt{\frac{361}{100}} + \sqrt{\frac{169}{100}}}{\sqrt{\frac{144}{100}} - \sqrt{\frac{64}{100}}}$$

$$= \frac{\frac{19}{10} + \frac{13}{10}}{\frac{12}{10} - \frac{8}{10}}$$

$$= \frac{32}{10} \cdot \frac{10}{4} = 8$$

Cevap: A

$$8. \sqrt{0,006} \cdot \sqrt{0,08} \cdot \sqrt{0,3} = \sqrt{\frac{6}{1000} \cdot \frac{8}{100} \cdot \frac{3}{10}}$$

$$= \sqrt{\frac{144}{1000000}}$$

$$= \frac{12}{1000}$$

$$= 0,012$$

Cevap: D

$$9. \sqrt{3 + \sqrt{2\sqrt{7} + 1}} - \sqrt{3 - \sqrt{2\sqrt{7} + 1}} = x \text{ olsun.}$$

Eşitliğin her iki tarafının karesini alalım.

$$(\sqrt{3 + \sqrt{2\sqrt{7} + 1}} - \sqrt{3 - \sqrt{2\sqrt{7} + 1}})^2 = x^2$$

$$3 + \sqrt{2\sqrt{7} + 1} - 2\sqrt{9 - (2\sqrt{7} + 1)} + 3 - \sqrt{2\sqrt{7} + 1} = x^2$$

$$6 - 2\sqrt{9 - 2\sqrt{7} - 1} = x^2$$

$$6 - 2\sqrt{8 - 2\sqrt{7}} = x^2$$

$$\begin{array}{cc} \downarrow & \downarrow \\ 7+1 & 7.1 \end{array}$$

$$6 - 2(\sqrt{7} - 1) = x^2$$

$$6 - 2\sqrt{7} + 2 = x^2$$

$$8 - 2\sqrt{7} = x^2$$

$$\sqrt{8 - 2\sqrt{7}} = x \Rightarrow x = \sqrt{7} - 1$$

$$\begin{array}{cc} \downarrow & \downarrow \\ 7+1 & 7.1 \end{array}$$

Cevap: C

$$10. \sqrt[3]{2\sqrt{21} - \sqrt{23} + \sqrt{4}} = \sqrt[3]{2\sqrt{21} - \sqrt{23} + 2}$$

$$= \sqrt[3]{2\sqrt{21} - \sqrt{25}}$$

$$= \sqrt[3]{2\sqrt{21} - 5}$$

$$= \sqrt[3]{2\sqrt{16}}$$

$$= \sqrt[3]{2 \cdot 4} = \sqrt[3]{8} = \sqrt[3]{2^3}$$

$$= 2$$

Cevap: E

$$11. \sqrt{\frac{27}{4}} + \sqrt{\frac{3}{4}} - \sqrt{\frac{75}{4}} = \frac{\sqrt{9 \cdot 3}}{2} + \frac{\sqrt{3}}{2} - \frac{\sqrt{25 \cdot 3}}{2}$$

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

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

Cevap: D

$$12. \frac{3x-2}{\sqrt{3}+\sqrt{2}} = \sqrt{5-2\sqrt{6}} \Rightarrow \frac{3x-2}{\sqrt{3}+\sqrt{2}} = \sqrt{3}-\sqrt{2}$$

$$\begin{array}{cc} \downarrow & \downarrow \\ 3+2 & 3.2 \end{array}$$

$$\Rightarrow 3x-2 = \underbrace{(\sqrt{3}-\sqrt{2})(\sqrt{3}+\sqrt{2})}_{\text{iki kare farkı}}$$

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

$$\Rightarrow 3x-2 = 3-2=1$$

$$\Rightarrow 3x=3 \Rightarrow x=1$$

Cevap: E

$$13. \frac{\sqrt{0,98} + \sqrt{1,62} + \sqrt{0,72}}{\sqrt{2,42}}$$

$$= \frac{\sqrt{\frac{98}{100}} + \sqrt{\frac{162}{100}} + \sqrt{\frac{72}{100}}}{\sqrt{\frac{242}{100}}}$$

$$= \frac{\frac{\sqrt{49 \cdot 2}}{10} + \frac{\sqrt{81 \cdot 2}}{10} + \frac{\sqrt{36 \cdot 2}}{10}}{\frac{\sqrt{121 \cdot 2}}{10}}$$

$$= \frac{7\sqrt{2} + 9\sqrt{2} + 6\sqrt{2}}{10} \cdot \frac{10}{11\sqrt{2}} = \frac{22\sqrt{2}}{11\sqrt{2}} = 2$$

Cevap: C

$$14. \frac{1+\sqrt{3}}{\sqrt{5}-\sqrt{3}} = a \Rightarrow \frac{1}{a} = \frac{\sqrt{5}-\sqrt{3}}{\sqrt{3}+1}$$

$$\frac{\sqrt{3}+\sqrt{5}}{\sqrt{3}-1} = b \text{ olsun.} \Rightarrow \frac{1}{x} b = \frac{\sqrt{5}+\sqrt{3}}{\sqrt{3}-1}$$

$$\frac{1}{a} \cdot b = \frac{\sqrt{5}-\sqrt{3}}{\sqrt{3}+1} \cdot \frac{\sqrt{5}+\sqrt{3}}{\sqrt{3}-1}$$

$$\frac{b}{a} = \frac{(\sqrt{5})^2 - (\sqrt{3})^2}{(\sqrt{3})^2 - 1^2}$$

$$\frac{b}{a} = \frac{5-3}{3-1}$$

$$\frac{b}{a} = \frac{2}{2} = 1 \Rightarrow b = a$$

Cevap: B

$$15. \sqrt{\frac{10}{9}} - \sqrt{\frac{10}{9}} - \sqrt{\frac{10}{9}} \dots = ?$$

$$a.(a+1) = \frac{10}{9} \text{ olsun. Buradan } a = \frac{2}{3}, a+1 = \frac{5}{3} \text{ olur.}$$

O halde verilen çıkarma işleminin sonucu $\boxed{a = \frac{2}{3}}$ tür.

(Küçük olan sayı)

Cevap: D

$$16. \sqrt{\frac{abc, abc}{a, bcabc}} + \sqrt{\frac{1111}{11} + 20}$$

$$= \sqrt{\frac{abcabc00}{abcabc}} + \sqrt{\frac{1111+220}{11}}$$

$$= \sqrt{100} + \sqrt{\frac{1331}{11}} = 10 + \sqrt{121} = 10 + 11 = 21$$

Cevap: E

$$17. \sqrt[4]{(1-\sqrt{3})^4} + \sqrt[3]{(1-\sqrt{3})^3}$$

$$= \underbrace{|1-\sqrt{3}|}_{<0} + (1-\sqrt{3})$$

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

$$= -1 + \sqrt{3} + 1 - \sqrt{3} = 0$$

Cevap: A

$$18. \frac{\frac{4}{\sqrt{3}-1} + \frac{2}{\sqrt{2}+1}}{\frac{1}{\sqrt{3}+1} \cdot \frac{1}{\sqrt{2}-1}} = \frac{\frac{4 \cdot (\sqrt{3}+1)}{2} + \frac{2 \cdot (\sqrt{2}-1)}{1}}{\frac{1}{\sqrt{3}-\sqrt{2}}}$$

$$\begin{array}{ccc} \downarrow & & \downarrow \\ 3+2 & & 3 \cdot 2 \end{array}$$

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

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

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

Cevap: E

$$19. \frac{2}{\sqrt{3}-\sqrt{2}} + \frac{1}{3+\sqrt{8}} - \frac{2}{2+\sqrt{3}}$$

$$= \frac{2(\sqrt{3}+\sqrt{2})}{(\sqrt{3})^2 - (\sqrt{2})^2} + \frac{3-\sqrt{8}}{3^2 - (\sqrt{8})^2} - \frac{2(2+\sqrt{3})}{2^2 - (\sqrt{3})^2}$$

$$= \frac{2\sqrt{3}+2\sqrt{2}}{3-2} + \frac{3-\sqrt{8}}{9-8} - \frac{4+2\sqrt{3}}{4-3}$$

$$= 2\sqrt{3} + 2\sqrt{2} + 3 - 2\sqrt{2} - 4 - 2\sqrt{3} = 3 - 4 = -1$$

Cevap: E

$$20. a = \sqrt{(1-\sqrt{5})^2} = \underbrace{|1-\sqrt{5}|}_{<0} = -1 + \sqrt{5}$$

$$b = \sqrt{(\sqrt{5}-\sqrt{20})^2} = \sqrt{(\sqrt{5}-\sqrt{4 \cdot 5})^2}$$

$$= \sqrt{(\sqrt{5}-2\sqrt{5})^2}$$

$$= \sqrt{(-\sqrt{5})^2} = \sqrt{5}$$

$$\Rightarrow a + b = -1 + \sqrt{5} + \sqrt{5} = 2\sqrt{5} - 1$$

Cevap: A