

$$1. \quad x = \sqrt{11} + \sqrt{7} \rightarrow x^2 = (\sqrt{11} + \sqrt{7})^2 = 11 + 2\sqrt{77} + 7 = 18 + 2\sqrt{77}$$

$$y = \sqrt{12} + \sqrt{6} \rightarrow y^2 = (\sqrt{12} + \sqrt{6})^2 = 12 + 2\sqrt{72} + 6 = 18 + 2\sqrt{72}$$

$$z = \sqrt{10} + \sqrt{8} \rightarrow z^2 = (\sqrt{10} + \sqrt{8})^2 = 10 + 2\sqrt{80} + 8 = 18 + 2\sqrt{80}$$

$$\Rightarrow z > x > y$$

Cevap: E

$$2. \quad 0 < x < 2$$

$$\sqrt{\sqrt{x^2 - 4x + 4} + (x^2 - 5x + 7)}$$

$$= \sqrt{\sqrt{(x-2)^2} + (x^2 - 5x + 7)}$$

$$= \sqrt{\underbrace{|x-2|}_{<0} + x^2 - 5x + 7}$$

$$= \sqrt{-x + 2 + x^2 - 5x + 7}$$

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

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

$$= \underbrace{|x-3|}_{<0}$$

$$= -x + 3$$

$$= 3 - x$$

$$3. \quad x > 0,$$

$$\sqrt{x(x-4)+4} = 3 \Rightarrow \sqrt{x^2 - 4x + 4} = 3$$

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

$$|x-2| = 3$$

$$1) x-2=3 \Rightarrow x=5$$

$$2) x-2=-3 \Rightarrow x=-1 \text{ olmaz! } (x > 0)$$

$$4. \quad x < 0 < y$$

$$\sqrt{(x-y)^2} + 3\sqrt{(x-y)^3} - \sqrt{x^2} + \sqrt{(-y)^2}$$

$$= \underbrace{|x-y|}_{<0} + x - y - \underbrace{|x|}_{<0} + \underbrace{|y|}_{>0}$$

$$= -x + y + x - y - (-x) + y = x + y$$

Cevap: C

$$5. \quad \frac{a}{b} \sqrt[2]{\frac{b}{a} \sqrt[2]{\left(\frac{a}{b}\right)^3}} = \frac{a}{b} \cdot 2 \cdot \sqrt[2]{\left(\frac{b}{a}\right)^2 \cdot \left(\frac{a}{b}\right)^3}$$

$$= \frac{a}{b} \cdot 4 \cdot \sqrt[2]{\underbrace{\left(\frac{b}{a}\right)^2 \cdot \left(\frac{a}{b}\right)^2}_{1} \cdot \frac{a}{b}}$$

$$= \frac{a}{b} \cdot 4 \cdot \sqrt[2]{\frac{a}{b}}$$

$$= \left(\frac{a}{b}\right)^1 \cdot \left(\frac{a}{b}\right)^{\frac{1}{4}}$$

$$= \left(\frac{a}{b}\right)^{\frac{5}{4}}$$

$$= \sqrt[4]{\left(\frac{a}{b}\right)^5}$$

Cevap: A

$$6. \quad \sqrt[2]{a+1} - \sqrt[2]{16a+16} + 2\sqrt[2]{81a+81} = 45$$

$$\Rightarrow \sqrt{a+1} - \sqrt{16(a+1)} + 2\sqrt{81(a+1)} = 45$$

$$\Rightarrow \sqrt{a+1} - 4\sqrt{a+1} + 2 \cdot 9\sqrt{a+1} = 45$$

$$\Rightarrow 15\sqrt{a+1} = 45$$

$$\Rightarrow \sqrt{a+1} = 3$$

$$\Rightarrow a+1=9 \Rightarrow a=8$$

Cevap: C

$$7. \quad 0 < x < y$$

$$\sqrt{(x-y)^2} - 4\sqrt{x^4} - 3\sqrt{y^3} + \sqrt{x^4} = 0$$

$$\Rightarrow \underbrace{|x-y|}_{<0} - \underbrace{|x|}_{>0} - y + x^2 = 0$$

$$-x + y - x - y + x^2 = 0$$

$$x^2 - 2x = 0$$

$$x(x-2) = 0 \Rightarrow x=0 \text{ olmaz! } (0 < x)$$

$$x-2=0 \Rightarrow x=2$$

Cevap: B

$$\begin{aligned}
 8. \quad & \sqrt[3]{x-2} + \sqrt[3]{8x-16} = 6 \\
 & \sqrt[3]{x-2} + \sqrt[3]{8 \cdot (x-2)} = 6 \\
 & \sqrt[3]{x-2} + \sqrt[3]{8} \cdot \sqrt[3]{x-2} = 6 \\
 & \sqrt[3]{x-2} + 2 \cdot \sqrt[3]{x-2} = 6 \\
 & 3 \cdot \sqrt[3]{x-2} = 6 \Rightarrow (\sqrt[3]{x-2})^3 = 2^3 \\
 & \quad \quad \quad x-2 = 8 \\
 & \quad \quad \quad x = 10
 \end{aligned}$$

Cevap: E

$$\begin{aligned}
 9. \quad & x \in [-2, 2] \Rightarrow -2 \leq x \leq 2 \\
 & \sqrt{(x-2)^2} + \sqrt{(x+3)^2} = \underbrace{|x-2|}_{<0} + \underbrace{|x+3|}_{>0} \\
 & = -(x-2) + (x+3) \\
 & = -x + 2 + x + 3 \\
 & = 5
 \end{aligned}$$

Cevap: D

$$\begin{aligned}
 10. \quad & \frac{\sqrt{x \cdot y}}{a} = 2 \\
 & \frac{\sqrt{x \cdot z}}{b} = 3 \\
 x \quad & \frac{\sqrt{y \cdot z}}{c} = 4
 \end{aligned}$$

$$\begin{aligned}
 \frac{\sqrt{x \cdot y \cdot x \cdot z \cdot y \cdot z}}{a \cdot b \cdot c} = 2 \cdot 3 \cdot 4 & \Rightarrow \frac{\sqrt{x^2 \cdot y^2 \cdot z^2}}{a \cdot b \cdot c} = 24 \\
 & \Rightarrow \frac{x \cdot y \cdot z}{a \cdot b \cdot c} = 24
 \end{aligned}$$

Cevap: D

$$11. \quad \frac{\sqrt{x}}{\sqrt{x+\sqrt{y}} + \sqrt{x-\sqrt{y}}} + \frac{\sqrt{y}}{\sqrt{x+\sqrt{y}} - \sqrt{x-\sqrt{y}}} = \frac{3}{2}$$

$$\frac{\sqrt{x} \cdot (\sqrt{x+\sqrt{y}} - \sqrt{x-\sqrt{y}}) + \sqrt{y} \cdot (\sqrt{x+\sqrt{y}} + \sqrt{x-\sqrt{y}})}{(\sqrt{x})^2 - (\sqrt{y})^2} = \frac{3}{2}$$

$$\frac{x - \sqrt{x \cdot y} + \sqrt{x \cdot y} + y}{x - y} = \frac{3}{2}$$

$$\frac{x+y}{x-y} = \frac{3}{2} \Rightarrow 2x+2y=3x-3y \Rightarrow x=5y$$

$$\Rightarrow \frac{x}{y} = 5$$

Cevap: A

$$\begin{aligned}
 12. \quad & \frac{a\sqrt{b} + b\sqrt{a}}{\sqrt{a} + \sqrt{b}} = \frac{(a\sqrt{b} + b\sqrt{a}) \cdot (\sqrt{a} - \sqrt{b})}{(\sqrt{a})^2 - (\sqrt{b})^2} \\
 & = \frac{a\sqrt{a \cdot b} - a \cdot b + a \cdot b - b\sqrt{a \cdot b}}{a - b} \\
 & = \frac{\sqrt{a \cdot b} \cdot (a - b)}{a - b} \\
 & = \sqrt{a \cdot b}
 \end{aligned}$$

Cevap: E

$$13. \quad x < 0$$

$$\begin{aligned}
 \sqrt{x^2 - 2x + 1} + \sqrt{x^2} - \sqrt[3]{-x^3} & = \sqrt{(x-1)^2} + \sqrt{x^2} - \sqrt[3]{(-x)^3} \\
 & = \underbrace{|x-1|}_{<0} + \underbrace{|x|}_{<0} - (-x) \\
 & = -x + 1 + -x + x \\
 & = 1 - x
 \end{aligned}$$

Cevap: A

$$14. \quad \sqrt{x+1} = \sqrt[3]{x+1}$$

$$1) \quad x+1=0 \Rightarrow x=-1$$

$$\Rightarrow (-1) \cdot 0 = 0$$

$$2) \quad x+1=1 \Rightarrow x=0$$

Cevap: B

15. $a = 3 + \sqrt{3}$

$$b = \frac{\sqrt{3a} \cdot \sqrt[4]{a^2}}{\sqrt{3} + \sqrt[3]{27}} = \frac{\sqrt{3a} \cdot a^{\frac{1}{2}}}{\sqrt{3} + \sqrt[3]{3^3}}$$

$$= \frac{\sqrt{3} \cdot \sqrt{a} \cdot \sqrt{a}}{(\sqrt{3} + 3) \rightarrow a}$$

$$= \frac{\sqrt{3} \cdot a}{a} = \sqrt{3}$$

Cevap: E

16. $\frac{\sqrt[3]{a^2} + a}{\sqrt[3]{a} + a} - \frac{\sqrt[3]{a} - 1}{\sqrt[3]{a^2} + 1}$

$$= \frac{\frac{2}{a^3} + a}{\frac{1}{a^3} + a} - \frac{\frac{1}{a^3} - 1}{\frac{2}{a^3} + 1}$$

$$(1) \quad (a^{\frac{1}{3}})$$

$$= \frac{\frac{2}{a^3} + a - a \frac{2}{a^3} + a \frac{1}{a^3}}{\frac{1}{a^3} + a} = \frac{a + a \frac{1}{a^3}}{a + a^{\frac{1}{3}}} = 1$$

17. $b < 0 < a$ olmak üzere;

$$\sqrt{(3a-b)^2} - \sqrt{(b-a)^2} = \underbrace{|3a-b|}_{>0} - \underbrace{|b-a|}_{<0}$$

$$= (3a-b) - (-b+a)$$

$$= 3a - b + b - a$$

$$= 2a$$

Cevap: A

18. $\left(\sqrt{\frac{\sqrt{x}+5}{\sqrt{x}-5}} \right)^2 = (\sqrt{x}+5)^2$

$$\frac{\sqrt{x}+5}{\sqrt{x}-5} = (\sqrt{x}+5) \cdot (\sqrt{x}+5)$$

$$\frac{1}{\sqrt{x}-5} = \sqrt{x}+5 \Rightarrow (\sqrt{x}+5) \cdot (\sqrt{x}-5) = 1$$

$$\Rightarrow (\sqrt{x})^2 - 5^2 = 1$$

$$\Rightarrow x - 25 = 1$$

$$\Rightarrow x = 26$$

Cevap: C

19. $\frac{10}{\sqrt{6}-1} + \frac{3}{\sqrt{2}+1} - \frac{\sqrt{6}}{2-\sqrt{3}}$

$$= \frac{10 \cdot (\sqrt{6}+1)}{(\sqrt{6})^2 - 1^2} + \frac{3 \cdot (\sqrt{2}-1)}{(\sqrt{2})^2 - 1^2} - \frac{\sqrt{6} \cdot (2+\sqrt{3})}{2^2 - (\sqrt{3})^2}$$

$$= \frac{10 \cdot (\sqrt{6}+1)}{5} + \frac{3 \cdot (\sqrt{2}-1)}{1} - \frac{\sqrt{6} \cdot (2+\sqrt{3})}{1}$$

$$= 2\sqrt{6} + 2 + 3\sqrt{2} - 3 - 2\sqrt{6} - \frac{\sqrt{18}}{3\sqrt{2}}$$

$$= 2 - 3 = -1$$

Cevap: A

Cevap: D

20. $\frac{\sqrt{21} - \sqrt{15} + \sqrt{10} - \sqrt{14}}{\sqrt{7} - \sqrt{5}} \cdot (\sqrt{3} + \sqrt{2})$

$$= \frac{\sqrt{21} - \sqrt{14} - \sqrt{15} + \sqrt{10}}{\sqrt{7} - \sqrt{5}} \cdot (\sqrt{3} + \sqrt{2})$$

$$= \frac{\sqrt{7} \cdot (\sqrt{3} - \sqrt{2}) - \sqrt{5} \cdot (\sqrt{3} - \sqrt{2})}{\sqrt{7} - \sqrt{5}} \cdot (\sqrt{3} + \sqrt{2})$$

$$= \frac{(\sqrt{3} - \sqrt{2}) \cdot (\sqrt{7} - \sqrt{5})}{\sqrt{7} - \sqrt{5}} \cdot (\sqrt{3} + \sqrt{2})$$

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

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

Cevap: A