

## KÖKLÜ İFADELER

$a, b \in \mathbb{R}^+$ ,  $n \in \mathbb{N}^+$  ve  $n \geq 2$  olmak üzere  $b^n = a$  ifadesindeki  $b$  sayısına  $a$  sayısının " $n$ . kuvvetten kökü" denir.

$$b^n = a \Leftrightarrow b = \sqrt[n]{a} = a^{\frac{1}{n}}$$

şeklinde gösterilir.

**NOT:**  $\sqrt[n]{f(x)} \in \mathbb{R}$  olması için  $f(x) \geq 0$  olmalıdır.

Her  $f(x) \in \mathbb{R}$  için  $\sqrt[n]{f(x)} \in \mathbb{R}'$  dir.

**Örnek:**  $\sqrt{25} \in \mathbb{R}$ ,  $\sqrt{0} \in \mathbb{R}$ ,  $\sqrt[4]{81} \in \mathbb{R}$ ,  $\sqrt[3]{7} \in \mathbb{R}$ ,  $\sqrt[2]{0} \in \mathbb{R}$ ,  $\sqrt{-3} \notin \mathbb{R}$ ,  $\sqrt[5]{-3} \in \mathbb{R}$

### Köklü Sayılarda İşlemlere Ait Özellikler:

1.  $k \cdot \sqrt[n]{a} \mp p \cdot \sqrt[n]{a} = (k \mp p) \cdot \sqrt[n]{a}$

2.  $(k \cdot \sqrt[n]{a}) \cdot (p \cdot \sqrt[n]{b}) = (k \cdot p) \cdot \sqrt[n]{a \cdot b}$

3.  $\frac{k \cdot \sqrt[n]{a}}{p \cdot \sqrt[n]{b}} = \frac{k}{p} \cdot \sqrt[n]{\frac{a}{b}}$ ,  $p, b \neq 0$

4.  $\sqrt[m]{\sqrt[n]{a}} = \sqrt[m \cdot n]{a}$

$$5. \sqrt[n]{a}\sqrt[n]{b} = \sqrt[n]{a^n b} = \sqrt[n]{a^n} \cdot \sqrt[n]{b}$$

$$6. (\sqrt[n]{a})^n = \sqrt[n]{a^n}$$

$$7. \sqrt[n]{a^n} = a^{\frac{n}{n}}$$

$$8. n \text{ tek ise: } \sqrt[n]{a^n \cdot b} = a \cdot \sqrt[n]{b}$$

$$n \text{ çift ise: } \sqrt[n]{a^n \cdot b} = |a| \cdot \sqrt[n]{b}$$

**Örnek:**

$$\sqrt{0,64} + \sqrt{0,04} - \sqrt[3]{0,027} = \sqrt{\frac{64}{100}} + \sqrt{\frac{4}{100}} - \sqrt[3]{\frac{27}{1000}}$$

$$= \sqrt{\left(\frac{8}{10}\right)^2} + \sqrt{\left(\frac{2}{10}\right)^2} - \sqrt[3]{\left(\frac{3}{10}\right)^3}$$

$$= \frac{8}{10} + \frac{2}{10} - \frac{3}{10}$$

$$= \frac{7}{10}$$

$$= 0,7$$

**Örnek:**

$$\frac{\sqrt{75} - \sqrt{27} + \sqrt{12}}{\sqrt{108} + \sqrt{48}} = \frac{\sqrt{5^2 \cdot 3} - \sqrt{3^2 \cdot 3} + \sqrt{2^2 \cdot 3}}{\sqrt{6^2 \cdot 3} + \sqrt{4^2 \cdot 3}}$$

$$= \frac{5\sqrt{3} - 3\sqrt{3} + 2\sqrt{3}}{6\sqrt{3} + 4\sqrt{3}}$$

$$= \frac{4\sqrt{3}}{10\sqrt{3}}$$

$$= \frac{2}{5}$$

$$\frac{\partial}{\partial} \sqrt{16} - \sqrt{9} + \sqrt{25} = ?$$

$$\frac{\partial}{\partial} \sqrt[3]{27} + \sqrt[4]{16} - \sqrt[5]{32} = ?$$

$$\frac{\partial}{\partial} \sqrt{3^x} = 27 \text{ ise } x = ?$$

$$\frac{\partial}{\partial} \sqrt{4 + \sqrt{25}} = ?$$

$$\frac{\partial}{\partial} \sqrt[4]{(36)^2}$$

$$\frac{\partial}{\partial} \sqrt{(\sqrt{5}-2)^2} + \sqrt{(\sqrt{5}-3)^2} = ?$$

$$\frac{\partial}{\partial} \sqrt{108} = ?$$

$$\sqrt{36 \cdot 3} = 6\sqrt{3}$$

$$\underline{\text{ör}} \quad 5\sqrt{2} + 3\sqrt{2} - 2\sqrt{2} + \sqrt{2} = ?$$

$$\underline{\text{ör}} \quad \sqrt{12} + 2\sqrt{27} - 3\sqrt{3} = ?$$

$$\underline{\text{ör}} \quad \sqrt[5]{\left(\frac{1}{32}\right)^{-1}} = ?$$

$$\underline{\text{ör}} \quad \frac{\sqrt{0,36} - \sqrt{0,25}}{\sqrt{0,01} + \sqrt{0,09}} = ?$$

$$\underline{\text{ör}} \quad \frac{1}{\sqrt{5}-\sqrt{3}} + \frac{1}{\sqrt{5}+\sqrt{3}} = ?$$