

1. $x \neq 0, y \neq 0$

$$\frac{1}{x} - \frac{1}{y} = \frac{1}{4}$$

$$\frac{1}{x^2} - \frac{1}{y^2} = \frac{3}{16} \Rightarrow \underbrace{\left(\frac{1}{x} - \frac{1}{y}\right)}_{\frac{1}{4}} \cdot \left(\frac{1}{x} + \frac{1}{y}\right) = \frac{3}{16}$$

$$\Rightarrow \frac{1}{x} + \frac{1}{y} = \frac{3}{16} \cdot 4$$

$$\Rightarrow \frac{1}{x} + \frac{1}{y} = \frac{3}{4}$$

$$+ \frac{1}{x} - \frac{1}{y} = \frac{1}{4}$$

$$\frac{2}{x} = 1 \rightarrow x = 2$$

$$\frac{1}{x} + \frac{1}{y} = \frac{3}{4} \Rightarrow \frac{1}{2} + \frac{1}{y} = \frac{3}{4}$$

$$\frac{1}{y} = \frac{3}{4} - \frac{1}{2}$$

$$\frac{1}{y} = \frac{1}{4}$$

$$\Rightarrow y = 4$$

$$x + y = 2 + 4 = 6$$

Cevap: C

2. $a \cdot b = 3$

$$\frac{1}{a^2} + \frac{1}{b^2} = 2 \Rightarrow \frac{a^2 + b^2}{(a \cdot b)^2} = 2$$

$$\Rightarrow \frac{a^2 + b^2}{3^2} = 2$$

$$\Rightarrow a^2 + b^2 = 18$$

$$\Rightarrow (a - b)^2 = a^2 - 2a \cdot b + b^2 = \underbrace{a^2 + b^2}_{18} - \underbrace{2a \cdot b}_{2 \cdot 3}$$

$$= 18 - 6$$

$$= 12$$

Cevap: C

3. $\frac{2x^2}{x} - \frac{5x}{x} + \frac{2}{x} = \frac{0}{x} \rightarrow$ Verilen denklemin bütün terimlerini x'e bölelim.

$$2x - 5 + \frac{2}{x} = 0 \Rightarrow 2x + \frac{2}{x} = 5$$

$$\left(2x + \frac{2}{x}\right)^2 = 5^2$$

$$4x^2 + \frac{4}{x^2} + 2 \cdot 2x \cdot \frac{2}{x} = 25$$

$$4x^2 + \frac{4}{x^2} = 25 - 8 = 17$$

Cevap: A

TASARI EĞİTİM YAYINLARI

4. $\frac{x^2 - 2}{x - \sqrt{2}} + 2 - \sqrt{2} = 5$

$$\Rightarrow \frac{(x - \sqrt{2}) \cdot (x + \sqrt{2})}{x - \sqrt{2}} + 2 - \sqrt{2} = 5$$

$$\Rightarrow x + \sqrt{2} + 2 - \sqrt{2} = 5$$

$$\Rightarrow x + 2 = 5$$

$$\Rightarrow x = 3$$

Cevap: C

5. $\frac{x^3 + y^3}{(x + y)^2} \cdot \frac{x + y}{xy - x^2 - y^2}$

$$= \frac{(x + y) \cdot (x^2 - xy + y^2)}{(x + y)^2} \cdot \frac{x + y}{-(x^2 - xy + y^2)} = -1$$

Cevap: A

6. $(a - b)^4 = a^4 - 4a^3b + 6a^2b^2 - 4ab^3 + b^4$

Binom açılımından;

$$\left(\frac{x}{y} - \frac{1}{x}\right)^4 = \left(\frac{x}{y}\right)^4 - 4 \cdot \left(\frac{x}{y}\right)^3 \cdot \frac{1}{x} + 6 \cdot \left(\frac{x}{y}\right)^2 \cdot \left(\frac{1}{x}\right)^2 - 4 \cdot \left(\frac{x}{y}\right) \cdot \left(\frac{1}{x}\right)^3 + \left(\frac{1}{x}\right)^4$$

Terimler çarpımı:

$$\frac{x^4}{y^4} - 4 \cdot \frac{x^3}{y^3} \cdot \frac{1}{x} + 6 \cdot \frac{x^2}{y^2} \cdot \frac{1}{x^2} - 4 \cdot \frac{x}{y} \cdot \frac{1}{x^3} + \frac{1}{x^4} = \frac{96}{y^{10}}$$

Cevap: A

7. $x + \sqrt{x} - \sqrt[3]{x} = 68 \Rightarrow x = ?$

Bu tür bir soruda, şıkları incelersek; C) şıkkındaki 64 sayısını x yerine yazdığımızda eşitliğin sağlandığını görürüz.

$$\begin{aligned} \boxed{x = 64} \text{ için } x + \sqrt{x} - \sqrt[3]{x} &= 64 + \sqrt{64} - \sqrt[3]{64} \\ &= 64 + 8 - 4 \\ &= 68 \end{aligned}$$

Cevap: C

8. $x, y \in \mathbb{Z}^+$

$$x^2 + 6x - 6y - y^2 = 20 \Rightarrow x^2 - y^2 + 6x - 6y = 20$$

$$x + y = 4 \quad (x - y) \cdot (x + y) + 6 \cdot (x - y) = 20$$

$$x^2 - y^2 = ? \quad (x - y) \cdot \underbrace{(x + y + 6)}_4 = 20$$

$$(x - y) \cdot 10 = 20$$

$$x - y = 2$$

$$x^2 - y^2 = (x - y) \cdot (x + y) = 2 \cdot 4 = 8$$

Cevap: A

9. $a^3 - b^3 = (a - b) \cdot (a^2 + a \cdot b + b^2)$ açılımından;

$$\frac{79^3 - 21^3}{79 \cdot 10^2 + 21^2} = \frac{(79 - 21) \cdot (79^2 + 79 \cdot 21 + 21^2)}{79 \cdot 10^2 + 21^2}$$

$$= \frac{58 \cdot (79 \cdot (79 + 21) + 21^2)}{79 \cdot 10^2 + 21^2}$$

$$= \frac{58 \cdot (\cancel{79 \cdot 100} + 21^2)}{\cancel{79 \cdot 10^2} + 21^2}$$

$$= 58$$

Cevap: B

$$\left. \begin{array}{l} 10. \ x > y \\ x^2 + y^2 = \sqrt{5} \\ x \cdot y = 1 \end{array} \right\} x^4 - y^4 = ?$$

$$(x^2 + y^2)^2 = (\sqrt{5})^2 \Rightarrow x^4 + 2x^2 \cdot y^2 + y^4 = 5$$

$$x^4 + y^4 + 2 \cdot \underbrace{(x \cdot y)^2}_1 = 5$$

$$1$$

$$x^4 + y^4 = 3$$

$$(x^2 - y^2)^2 = x^4 - 2 \cdot x^2 \cdot y^2 + y^4 = \underbrace{x^4 + y^4}_3 - 2 \cdot \underbrace{(x \cdot y)^2}_1 = 1$$

$$\Rightarrow x^2 - y^2 = 1$$

$$\Rightarrow x^4 - y^4 = \underbrace{(x^2 - y^2)}_1 \cdot \underbrace{(x^2 + y^2)}_{\sqrt{5}} = \sqrt{5}$$

Cevap: C

$$11. \begin{cases} x^2 - y^2 = 5 \\ x \cdot y = \sqrt{17} \end{cases} \Rightarrow x^2 + y^2 = ?$$

$$1) (x^2 - y^2)^2 = 5^2 \Rightarrow x^4 - 2x^2y^2 + y^4 = 25$$

$$\Rightarrow x^4 + y^4 - 2 \cdot \underbrace{(x \cdot y)^2}_{\sqrt{17}} = 25$$

$$\Rightarrow x^4 + y^4 = 25 + 2 \cdot 17 = 25 + 34 = 59$$

$$2) (x^2 + y^2)^2 = x^4 + 2x^2y^2 + y^4 = x^4 + y^4 + 2 \cdot \underbrace{(x \cdot y)^2}_{\sqrt{17}}$$

$$\Rightarrow (x^2 + y^2)^2 = 59 + 2 \cdot 17 = 59 + 34 = 93$$

$$\Rightarrow x^2 + y^2 = \sqrt{93}$$

Cevap: D

$$12. \underbrace{(2^x - 1) \cdot (2^x + 1)}_{(2^{2x} - 1)} \cdot \underbrace{(2^{2x} + 1) \cdot (2^{4x} + 1)}_{(2^{4x} - 1)} = 1023$$

$$\underbrace{(2^{2x} - 1) \cdot (2^{2x} + 1) \cdot (2^{4x} + 1)}_{(2^{4x} - 1)} = 1023$$

$$\underbrace{(2^{4x} - 1) \cdot (2^{4x} + 1)}_{2^{8x} - 1} = 1023$$

$$2^{8x} - 1 = 1023 \Rightarrow 2^{8x} = 1024$$

$$\Rightarrow 2^{8x} = 2^{10}$$

$$\Rightarrow 8x = 10$$

$$\Rightarrow x = \frac{10}{8} = \frac{5}{4}$$

Cevap: E

$$13. a + \frac{1}{2a} = \sqrt{10} \Rightarrow \left(a + \frac{1}{2a}\right)^2 = (\sqrt{10})^2$$

$$\Rightarrow a^2 + 2 \cdot a \cdot \frac{1}{2a} + \frac{1}{4a^2} = 10$$

$$\Rightarrow a^2 + \frac{1}{4a^2} + 1 = 10$$

$$\Rightarrow a^2 + \frac{1}{4a^2} = 9$$

$$\Rightarrow \sqrt{a^2 + \frac{1}{4a^2}} = 3$$

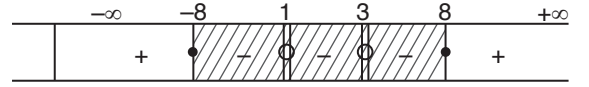
Cevap: B

$$14. \frac{(a^2 - 64)^{1991}}{(a - 1)^{2000} \cdot (a - 3)^{1990}} \leq 0$$

$$a^2 - 64 = 0 \Rightarrow a^2 = 64 \Rightarrow \boxed{a = -8}, \boxed{a = 8}$$

$$a - 1 = 0 \Rightarrow \boxed{a = 1}, a - 3 = 0 \Rightarrow \boxed{a = 3}$$

çift katlı kök çift katlı kök



Ç.K = [-8, 8] - {1, 3} (1 ve 3 paydayı sıfır yaptığı için çözüm kümesine dahil edemeyiz.)

Cevap: D

$$15. \begin{cases} 2x = y \Rightarrow \frac{x}{y} = \frac{1}{2} \Rightarrow \frac{x}{y} = \frac{5}{10} \\ 2y = 5z \Rightarrow \frac{y}{z} = \frac{5}{2} \Rightarrow \frac{y}{z} = \frac{10}{4} \end{cases} \Rightarrow \begin{cases} x = 5k \\ y = 10k \\ z = 4k \end{cases}$$

$$\left(\frac{x}{z}\right)^{-\frac{x}{y}} = \left(\frac{5k}{4k}\right)^{-\frac{5k}{10k}} = \left(\frac{5}{4}\right)^{-\frac{1}{2}} = \left(\frac{4}{5}\right)^{\frac{1}{2}}$$

$$= \sqrt{\frac{4}{5}}$$

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

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

Cevap: C

$$16. a = \sqrt{2} - 1$$

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

$$\downarrow \qquad \qquad \downarrow \qquad \qquad = (\sqrt{2} - 3) \cdot (\sqrt{2} + 4)$$

$$a \qquad \qquad -2 \qquad \qquad = 2 + 4\sqrt{2} - 3\sqrt{2} - 12$$

$$a \qquad \qquad 5 \qquad \qquad = \sqrt{2} - 10$$

Cevap: B

$$\begin{aligned}
 17. \quad 2017^2 - 2016^2 &= (2017 - 2016) \cdot (2017 + 2016) \\
 &= 1 \cdot 4033 \\
 &= 4033
 \end{aligned}$$

Cevap: C

$$\begin{array}{cccc}
 2x & -1 & 2x & -1 \\
 x & 1 & x & 3 \\
 \uparrow & \uparrow & \uparrow & \uparrow \\
 18. \quad \frac{2x^2+x-1}{x^2-1} : \frac{2x^2+5x-3}{x^2+2x-3} \\
 & & \downarrow & \downarrow \\
 & & x & 3 \\
 & & x & -1
 \end{array}$$

$$\begin{aligned}
 &= \frac{(2x-1) \cdot \cancel{(x+1)}}{(x-1) \cdot \cancel{(x+1)}} : \frac{(2x-1) \cdot \cancel{(x+3)}}{\cancel{(x+3)} \cdot (x-1)} \\
 &= \frac{\cancel{2x-1}}{\cancel{x-1}} \cdot \frac{\cancel{x-1}}{\cancel{2x-1}} \\
 &= 1
 \end{aligned}$$

Cevap: A

$$19. \quad a, b \in \mathbb{Z} ; \quad a + b = 2$$

$$\begin{aligned}
 a^2 + 5a - b^2 + 5b = 14 &\Rightarrow a^2 - b^2 + 5a + 5b = 14 \\
 &\Rightarrow (a-b) \cdot (a+b) + 5 \cdot (a+b) = 14 \\
 &\Rightarrow \underbrace{(a+b)}_2 \cdot (a-b+5) = 14 \\
 &\Rightarrow a-b+5 = 7 \\
 &\Rightarrow a - \cancel{b} = 2 \\
 &\quad + \quad a + \cancel{b} = 2 \\
 \hline
 2a = 4 &\rightarrow a = 2 \\
 a + b = 2 &\rightarrow 2 + b = 2 \\
 &\rightarrow \boxed{b = 0}
 \end{aligned}$$

Cevap: B

$$20. \quad x, y \in \mathbb{R}$$

$$2x^2 + y^2 + 2xy - 4x + 4 = 0$$

$$x^2 + x^2 + y^2 + 2xy - 4x + 4 = 0$$

$$x^2 - 4x + 4 + x^2 + 2xy + y^2 = 0$$

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

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

$$x+y=0 \quad \Rightarrow 2+y=0 \quad \Rightarrow y=-2$$

$$\Rightarrow x+3y=2+3 \cdot (-2)=2-6=-4$$

Cevap: B