

$$\begin{aligned}
 1. \quad \frac{3+3^3+3^4+3^6}{3^6-1} &= \frac{3.(1+3^2)+3^4.(1+3^2)}{(3^3)^2-1} \\
 &= \frac{(1+3^2).(3+3^4)}{(3^3-1).(3^3+1)} \\
 &= \frac{(1+9).(3+81)}{(27-1).(27+1)} \\
 &= \frac{10 \cdot 84}{26 \cdot 28} = \frac{15}{13}
 \end{aligned}$$

Cevap: A

$$\begin{aligned}
 2. \quad \frac{(-2)^{-3}-(-3^{-2})}{(-3)^{-2}-(-2)^{-3}} &= \frac{-2^{-3}+3^{-2}}{3^{-2}+2^{-3}} \\
 &= \frac{-\frac{1}{8}+\frac{1}{9}}{\frac{1}{9}+\frac{1}{8}} \\
 &= \frac{-\frac{9+8}{72}}{\frac{8+9}{72}} \\
 &= -\frac{1}{72} \cdot \frac{72}{17} = -\frac{1}{17}
 \end{aligned}$$

Cevap: A

$$\begin{aligned}
 3. \quad \frac{2^{17}-2^{16}+2^{15}}{2^{16}-2^{15}} &= \frac{2^{15}.2^2-2^{15}.2+2^{15}}{2^{15}.2-2^{15}} \\
 &= \frac{2^{15}.(4-2+1)}{2^{15}.(2-1)} = \frac{3}{1} = 3
 \end{aligned}$$

Cevap: B

$$\begin{aligned}
 4. \quad \frac{2^{2002}+2^{2001}+2^{2000}}{2^{-2004}+2^{-2003}+2^{-2002}} &= \frac{2^{2000}.(2^2+2^1+1)}{2^{-2004}.(1+2^1+2^2)} \\
 &= 2^{2000+2004} \\
 &= 2^{4004}
 \end{aligned}$$

Cevap: E

$$\begin{aligned}
 5. \quad (0,000027)^{\frac{11}{3}} \cdot 10^{22} &= (27 \cdot 10^{-6})^{\frac{11}{3}} \cdot 10^{22} \\
 &= 3^{\frac{11}{3}} \cdot 10^{-\frac{2}{3} \cdot 11} \cdot 10^{22} \\
 &= 3^{11} \cdot 10^{-22} \cdot 10^{22} \\
 &= 3^{11} \cdot 10^0 = 3^{11} \\
 &\quad \downarrow \\
 &\quad 1
 \end{aligned}$$

Cevap: E

$$\begin{aligned}
 6. \quad \underbrace{2^{2018} - 2^{2017} - 2^{2016} - \dots - 2^1}_{2^{2017} \cdot (2-1)} \\
 \underbrace{2^{2017} - 2^{2016} - 2^{2015} - \dots - 2^1}_{2^{2016} \cdot (2-1)} \\
 \underbrace{2^{2016} - 2^{2015} - \dots - 2^1}_{2^{2015} - \dots - 2^1 = 2} \\
 \vdots
 \end{aligned}$$

Cevap: A

$$7. \quad \frac{2^4+2^5+2^6}{2^2+2^3+2^4} = \frac{2^4.(1+2+2^2)}{2^2.(1+2+2^2)} = 2^{4-2} = 2^2 = 4$$

Cevap: B

$$\begin{aligned}
 8. \quad \frac{[(4)^{-2} \cdot (-\frac{1}{3})^2]^{\frac{1}{2}}}{(-\frac{1}{6})^2} &= \frac{(\frac{1}{16} \cdot \frac{1}{9})^{\frac{1}{2}}}{\frac{1}{36}} \\
 &= \frac{(\frac{1}{16} \cdot 9)^{\frac{1}{2}}}{\frac{1}{36}} \\
 &= \sqrt{\frac{9}{16}} \cdot 36 \\
 &= \frac{3}{4} \cdot 36 = 27
 \end{aligned}$$

Cevap: A

$$9. \left(-\frac{1}{2}\right)^{1-2n} (-2)^{2n+1} \left(\frac{1}{8}\right)^{-n} = 128$$

$$(-2^{-1})^{1-2n} \cdot (-2)^{2n+1} \cdot (2^{-3})^{-n} = 128$$

$$-2^{2n-1} \cdot -2^{2n+1} \cdot 2^{3n} = 2^7$$

$$2^{2n-x} \cdot 2^{2n+x} \cdot 2^{3n} = 2^7$$

$$2^{7n} = 2^7$$

$$7n = 7 \Rightarrow n = 1$$

Cevap: D

$$10. \binom{4}{0}2^4 + \binom{4}{1}2^3 + \binom{4}{2}2^2 + \binom{4}{3}2^1 + \binom{4}{4}2^0$$

$$1 \quad 4 \quad \frac{4 \cdot 3}{2} = 6 \quad \binom{4}{1} = 4 \quad 1$$

$$= 1 \cdot 2^4 + 4 \cdot 2^3 + 6 \cdot 2^2 + 4 \cdot 2^1 + 1 \cdot 2^0$$

$$= 16 + 32 + 24 + 8 + 1 = 81 = 3^4$$

Cevap: C

$$11. [((-1)^7 + (-2)^3)]^{-1} : (-3^2) + 3^{-1}$$

$$= (-1 - 8)^{-1} : (-9) + \frac{1}{3}$$

$$= (-9)^{-1} : (-9) + \frac{1}{3}$$

$$= -\frac{1}{9} \cdot -\frac{1}{9} + \frac{1}{3}$$

$$= \frac{1}{81} + \frac{1}{3} = \frac{28}{81}$$

$$(1) \quad (27)$$

Cevap: D

$$12. x \neq 0, y \neq 0, (3^x)^{\frac{1}{y}} = (2^y)^{\frac{1}{y}} \Rightarrow 3^{\frac{x}{y}} = 2$$

$$\Rightarrow 3^{\frac{x}{y}+2} = 3^{\frac{x}{y}} \cdot 3^2 = 2 \cdot 3^2$$

Cevap: D

$$13. (x-3)^{x+1} = 1 \Rightarrow \max\{x\} = ?$$

$$1) x-3=1 \Rightarrow x=4$$

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

Çünkü  $x+1 = 2+1 = 3$  tek sayı

$$(-1)^3 = -1 \text{ olur.}$$

$$3) x+1=0 \Rightarrow x=-1$$

$$\Rightarrow \max\{x\} = 4$$

Cevap: D

$$14. 2^x = 9 \Rightarrow (2^x)^{\frac{1}{2}} = (3^2)^{\frac{1}{2}} \Rightarrow 2^{\frac{x}{2}} = 3$$

$$3^y = 16 \Rightarrow 2^4 = 3^y \Rightarrow 2^4 = \left(2^{\frac{x}{2}}\right)^y$$

$$2^4 = 2^{\frac{x \cdot y}{2}}$$

$$\Rightarrow 4 = \frac{x \cdot y}{2}$$

$$\Rightarrow x \cdot y = 8$$

Cevap: C

$$15. (3^{x+1})^{\frac{1}{x+1}} = (5)^{\frac{1}{x+1}} \Rightarrow (3)^2 = \left(5^{\frac{1}{x+1}}\right)^2$$

$$25^{\frac{1}{x+1}} = ? \Rightarrow 9 = (5^2)^{\frac{1}{x+1}}$$

$$\Rightarrow 9 = 25^{\frac{1}{x+1}}$$

Cevap: A

$$16. (3^x)^{-3} = 25 \Rightarrow (3^{-3})^x = 25$$

$$\frac{100}{\left(\frac{1}{27}\right)^x} = \frac{100}{(3^{-3})^x} = \frac{100}{25} = 4$$

Cevap: C

$$17. 2^a = b^{-1} \Rightarrow 4^{1-a} = ?$$

$$(2^a)^2 = (b^{-1})^2 \Rightarrow 4^a = b^{-2}$$

$$4^{1-a} = \frac{4}{4^a} = \frac{4}{b^{-2}} = 4 \cdot b^2$$

Cevap: E

$$18. 2^{-2x} = 3 \Rightarrow (0,5)^{-5x} = ?$$

$$2^{-2x} = 3 \Rightarrow (2^{2x})^{\frac{1}{2}} = \left(\frac{1}{3}\right)^{\frac{1}{2}} \Rightarrow 2^x = \sqrt{\frac{1}{3}} = \frac{1}{\sqrt{3}}$$

$$(0,5)^{-5x} = (2^{-1})^{-5x} = 2^{5x} = (2^x)^5 = \left(\frac{1}{\sqrt{3}}\right)^5$$

$$= \frac{1}{\sqrt{3^5}}$$

Cevap: A

$$19. 3^m = 5^n \Rightarrow 27^{\frac{m}{n}} = ?$$

$$(3^m)^{\frac{1}{n}} = (5^n)^{\frac{1}{n}} \Rightarrow 3^{\frac{m}{n}} = 5$$

$$27^{\frac{m}{n}} = (3^3)^{\frac{m}{n}} = \left(3^{\frac{m}{n}}\right)^3 = 5^3 = 125$$

Cevap: E

$$20. \left. \begin{array}{l} 8^x = 1 \\ 5^{x+y} = 25 \end{array} \right\} \Rightarrow y = ?$$

$$8^x = 1 \Rightarrow x = 0$$

$$5^{x+y} = 5^x \cdot 5^y = 25 \Rightarrow 5^0 \cdot 5^y = 25$$

$$\Rightarrow 1 \cdot 5^y = 25$$

$$\Rightarrow 5^y = 5^2$$

$$\Rightarrow y = 2$$

Cevap: C