

نام و نام خانوادگی شماره کلاس (نام و نام خانوادگی).....

$$(1 + (1 \times 2 \times 3) + (1 \times 2 \times 3 \times 4 \times 5) + \dots + (1 \times 2 \times 3 \times 4 \times 5 \times \dots \times n)) (1 \times 1 + (1 \times 2 \times 3 \times 4) + (1 \times 2 \times 3 \times 4 \times 5 \times 6) + \dots + (1 \times 2 \times 3 \times 4 \times 5 \times \dots \times n)) =$$

$$\downarrow \qquad \qquad \qquad \downarrow$$

$$1 + 2 + ab \dots om + \dots \qquad \qquad \qquad 1 + 2^2 + ac \dots om + \dots om + \dots$$

$$\downarrow \qquad \qquad \qquad \downarrow$$

$$\sqrt{\qquad} \qquad \qquad \sqrt{\qquad}$$

$$7 \times 26 = 182 \rightarrow 2$$

$$\text{الف)} \sqrt[2]{(2 + \sqrt{5})^{-1}} \times \sqrt{1 + \sqrt{5}} = \sqrt{\frac{1 + \sqrt{5}}{\frac{1}{\sqrt{5}} + \frac{1}{\sqrt{5}}}} = \sqrt{\frac{1}{\frac{1}{\sqrt{5}}}} = \sqrt{\sqrt{5}} = \sqrt[4]{5}$$

$$\text{ب)} (\sqrt{3} - \sqrt{5} - \sqrt{3 + \sqrt{5}}) = A \rightarrow A^2 = 3 - \sqrt{5} + 3 + \sqrt{5} - 2\sqrt{3}\sqrt{3 + \sqrt{5}} = 6 - 2\sqrt{3}\sqrt{3 + \sqrt{5}} = 2 \rightarrow A = \sqrt{2}$$

$$\frac{\sqrt{2} + \sqrt{5}}{\sqrt{2}(\sqrt{5} + \sqrt{2})} \times \sqrt{2} = \frac{1}{\sqrt{5} + \sqrt{2}} \rightarrow -1$$

$$\text{الف)} \frac{2\sqrt{2} + 3\sqrt{3}}{5 - \sqrt{5}} \times \frac{5 + \sqrt{5}}{5 + \sqrt{5}} = \frac{10\sqrt{2} + 15\sqrt{3} + 2\sqrt{10} + 3\sqrt{15}}{25 - 5} = \frac{10\sqrt{2} + 15\sqrt{3} + 2\sqrt{10} + 3\sqrt{15}}{20} = \frac{10\sqrt{2} + 15\sqrt{3}}{20} = \frac{2\sqrt{2} + 3\sqrt{3}}{4}$$

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

$$\text{ب)} \frac{\sqrt{3} - 1}{2 + \sqrt{3}} = \frac{(\sqrt{3} - 1)(\sqrt{3} + 1)}{(2 + \sqrt{3})(\sqrt{3} + 1)} = \frac{2 - 1}{2\sqrt{3} + 3 + \sqrt{3} + 1} = \frac{1}{3 + 3\sqrt{3}} = \frac{1}{3(1 + \sqrt{3})} = \frac{1}{3} \times \frac{1 - \sqrt{3}}{1 - 3} = \frac{1 - \sqrt{3}}{2}$$

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

$$\text{الف)} A = \frac{\sqrt{1 + \sqrt{3}} + \sqrt{\sqrt{3} - 1}}{\sqrt{\sqrt{3} - \sqrt{3}}} \rightarrow (A + 2)^2 = \frac{1 + \sqrt{3} + \sqrt{3} - 1 + 2\sqrt{1 + \sqrt{3}}\sqrt{\sqrt{3} - 1}}{3 - \sqrt{3} \times (\sqrt{3} + \sqrt{3})} = \frac{2(\sqrt{1 + \sqrt{3}}\sqrt{\sqrt{3} - 1})}{3 - 3} = \frac{2(\sqrt{1 + \sqrt{3}}\sqrt{\sqrt{3} - 1})}{0}$$

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

$$\text{ب)} \sqrt[12]{2^4} \times \sqrt[12]{(3^4 \times 2^4)^{12}} \times \sqrt[12]{2^4 \times 2^4} = \sqrt[12]{2^4 \times 3^{48} \times 2^4 \times 2^4} = \sqrt[12]{2^{52} \times 3^{48}} = 3 \times 2^4 = 3 \times 16 = 48$$

$$\frac{3^n (1 + 3 + 3^2 + 3^3 + 3^4 + 3^5)}{3^n (3^{-2} + 3^{-1} + 1 + 3^1 + 3^2 + 3^3)} \rightarrow \frac{3^n \times 3^6}{3^n \times \frac{1}{3}} = \frac{1}{1} \rightarrow 3^6 \times 3 = 3^7 \times 3^2 \times 3^1 = 3^{10}$$

$$3^n \times 3^1 = 3^{n-2} \times 3^2 \rightarrow 3^n = 3^2 \rightarrow n = 2$$

$$3^0 = 3^{n-2} \rightarrow n - 2 = 0 \rightarrow n = 2$$

$$\begin{aligned}
 & ((a-b)^{\frac{1}{2}})^{\frac{1}{2}} ((a+b)^{\frac{1}{2}})^{\frac{1}{2}} = \pm (1-\sqrt{2}) \rightarrow [(a-b)(a+b)]^{\frac{1}{4}} \rightarrow (a^2-b^2)^{\frac{1}{4}} \\
 & \rightarrow \left[\left(\sqrt[4]{\sqrt{2}-1} \right)^{\frac{1}{2}} - \left(\sqrt[4]{\sqrt{2}+1} \right)^{\frac{1}{2}} \right]^{\frac{1}{2}} \rightarrow \left[\left(\sqrt[4]{\sqrt{2}-1} - \sqrt[4]{\sqrt{2}+1} \right)^{\frac{1}{2}} \right]^{\frac{1}{2}} \rightarrow (\sqrt{2}-1 + \sqrt{2}+1 - 2\sqrt[4]{2-1})^{\frac{1}{4}} \\
 & \rightarrow (\sqrt{2}-1 + \sqrt{2}-1 - 2\sqrt[4]{2-1})^{\frac{1}{4}} \rightarrow 2\sqrt{2}-2 - 2\sqrt[4]{2-1} = 2\sqrt{2}-2\sqrt[4]{2-1} \rightarrow 2(\sqrt{2}-\sqrt[4]{2-1}) \\
 & 14(\sqrt{2}-\sqrt[4]{2-1}) = \pm (\sqrt{2}-\sqrt[4]{2-1}) \rightarrow \boxed{t=14}
 \end{aligned}$$

$$\begin{aligned}
 a &= \sqrt[4]{(1-\sqrt{2})^{\frac{1}{2}}} \rightarrow a = \sqrt{1-\sqrt{2}} \\
 \left[\left(a + \frac{1}{a} \right)^{\frac{1}{2}} - (\sqrt{2})^{\frac{1}{2}} \right]^{\frac{1}{2}} &= 1^{\frac{1}{2}} \rightarrow \left[\left(\frac{a^2+1}{a} \right)^{\frac{1}{2}} - 1 \right]^{\frac{1}{2}} = 1^{\frac{1}{2}} \rightarrow \left(\frac{a^2+1}{a} \right)^{\frac{1}{2}} = 1^{\frac{1}{2}} \rightarrow (a^2)^{\frac{1}{2}} = 1^{\frac{1}{2}} \rightarrow a^2 = 1^{\frac{1}{2}} \\
 &\rightarrow \left(\frac{1-\sqrt{2}+1}{\sqrt{1-\sqrt{2}}} \right)^{\frac{1}{2}} = \frac{2-\sqrt{2}}{\sqrt{1-\sqrt{2}}} = \frac{2-\sqrt{2}}{1-\sqrt{2}} = \frac{2-\sqrt{2}}{1-\sqrt{2}} = 1
 \end{aligned}$$

$$\begin{aligned}
 A &= \sqrt[4]{\frac{1}{2} \times \frac{1}{2}} \times 1^{\frac{1}{2}} \rightarrow 1^{\frac{1}{4}} \times 1^{\frac{1}{4}} = 1^{\frac{1}{2}} = 1 \\
 (1A)^{-\frac{1}{2}} &= (1 \times 1)^{-\frac{1}{2}} = (1^{\frac{1}{2}})^{-\frac{1}{2}} = 1^{-\frac{1}{2}} = 1^{-1} = \left(\frac{1}{1} \right)
 \end{aligned}$$

$$\begin{aligned}
 \sqrt[n]{a} &= n\sqrt[n]{a} \rightarrow a = n^{\frac{1}{n}} \times a^{\frac{1}{n}} \rightarrow n^{-\frac{1}{n}} = a^{\frac{1}{n}} \rightarrow n^{-\frac{1}{n}} = a^{\frac{1}{n}} \rightarrow a = n^{-\frac{1}{n}} \\
 \frac{1}{a} - n &= a^{-1} - n = \left(n^{-\frac{1}{n}} \right)^{-1} - n = n^{\frac{1}{n}} - n = n(\sqrt[n]{n} - 1) \\
 \frac{n(\sqrt[n]{n} - 1)}{(\sqrt[n]{n} + 1)} \times \frac{(\sqrt[n]{n} - 1)}{(\sqrt[n]{n} - 1)} &= \frac{n(n+1 - n\sqrt[n]{n})}{n-1} = \frac{n(n - n\sqrt[n]{n})}{n-1} = \frac{n \times n(1 - \sqrt[n]{n})}{n-1} = \frac{n-1\sqrt[n]{n}}{1}
 \end{aligned}$$

$$\begin{aligned}
 A &= \sqrt{n+a} & A+B &= 2 & A+B &=? \\
 B &= \sqrt{n-a} & (A+B)(A-B) &=? & \rightarrow A^2-B^2 &=? \rightarrow n+a-n+a=? \rightarrow ? = \frac{a+a}{2} \\
 \Rightarrow \sqrt{n-a} + \sqrt{n+a} - 2 &= A+B-2 = ?-2 = \frac{a+a}{2} - \frac{2}{2} = \left(\frac{a}{2} \right)
 \end{aligned}$$