

$$\left. \begin{aligned} \frac{1}{1} + \frac{1}{4} + \frac{1}{9} + \dots + \frac{1}{2500} &= 7 \\ \frac{1}{1} + \frac{1}{4} + \frac{1}{9} + \dots + \frac{1}{2500} &= 7 \end{aligned} \right\} \rightarrow 4+7 \rightarrow \boxed{11}$$

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

ب) $\left(\frac{\sqrt{2+\sqrt{5}}}{\sqrt{1+\sqrt{2}}} \right) (\sqrt{3-\sqrt{5}} - \sqrt{3+\sqrt{5}}) = \frac{\sqrt{2}}{\sqrt{1+\sqrt{2}}} (\sqrt{2+\sqrt{5}} - \sqrt{3+\sqrt{5}}) =$
 $\frac{\sqrt{4-2\sqrt{5}} - \sqrt{4+2\sqrt{5}}}{\sqrt{2(1+\sqrt{2})}} = \frac{(\sqrt{5}-1) - (\sqrt{5}+1)}{2} = -\frac{2}{2} = \boxed{-1}$

الف) $\frac{\sqrt{2}+\sqrt{3}}{8-\sqrt{4}} - \frac{2}{\sqrt{2}-1} \xrightarrow{\text{مخرج مشترک}} \frac{(\sqrt{2}+\sqrt{3})(\sqrt{2}+1)}{19} - (\sqrt{2}+1) = \frac{1-\sqrt{2}+2\sqrt{6}+3-2\sqrt{2}-2}{19} =$
 $= \frac{\sqrt{2}+\sqrt{6}-\sqrt{2}-1}{19} = \boxed{\frac{\sqrt{6}-1}{19}}$

ب) $\frac{\sqrt{3}-1}{4+\sqrt{2}} + \frac{1}{2-\sqrt{2}} \xrightarrow{\text{مخرج مشترک}} \frac{(\sqrt{3}-1)(2-\sqrt{2})}{12} + \frac{2+\sqrt{2}}{12} = \frac{12\sqrt{2}-4-9+\sqrt{2}+2\sqrt{2}}{12} =$
 $\frac{\sqrt{2}-1+2+\sqrt{2}}{12} = \boxed{\frac{2\sqrt{2}+1}{12}}$

الف) $\frac{\sqrt{1+\sqrt{2}} + \sqrt{\sqrt{2}-1}}{\sqrt{5-\sqrt{2}}} - 2 = \frac{\sqrt{(1+\sqrt{2})(\sqrt{2}+1)} + \sqrt{(\sqrt{2}-1)(\sqrt{2}+1)}}{\sqrt{5-\sqrt{2}}} = \frac{\sqrt{(1+\sqrt{2})(\sqrt{2}+1)} + \sqrt{(\sqrt{2}-1)(\sqrt{2}+1)}}{\sqrt{5-\sqrt{2}}} =$
 $\frac{\sqrt{4+2\sqrt{2}} + \sqrt{1-2\sqrt{2}}}{\sqrt{5-\sqrt{2}}} = \frac{\sqrt{1+2\sqrt{2}} - \sqrt{1-2\sqrt{2}}}{\sqrt{5-\sqrt{2}}} = \frac{1+2\sqrt{2} - (1-2\sqrt{2})}{\sqrt{5-\sqrt{2}}} = \frac{4\sqrt{2}}{\sqrt{5-\sqrt{2}}} = \frac{4\sqrt{2} \times \sqrt{5+\sqrt{2}}}{\sqrt{25-2}} = \frac{4\sqrt{10+5\sqrt{2}}}{\sqrt{23}} = \boxed{\sqrt{4}}$
 ب) $\sqrt[4]{2} \times \sqrt[4]{2} \times \sqrt[4]{2} = 2 \times \sqrt[4]{2} = \boxed{12}$

$\frac{2^x \left(\frac{2^y-1}{2-1} \right)}{2^{n-2} \left(\frac{2^y-1}{2-1} \right)} = 82 \Rightarrow \frac{2^x \left(\frac{2^y-1}{2} \right)}{2^{n-2} \times 42} = 82$
 $\frac{2^x \times 2^y \times 2^y}{2^{n-2} \times 42 \times 2} = 82 \Rightarrow \frac{2^x}{2^{n-2}} = 9 \times 2^{n-2}$
 $2^x = 2^{n-2} \Rightarrow n-2=0 \Rightarrow \boxed{n=2}$

$$(a-b)^2(a+b)^2 = (a^2-b^2)^2 = \left(\sqrt{17(12-17)} - \sqrt{17(17+12)} \right)^2 = \left(\sqrt{17}(\sqrt{12-17} - \sqrt{17+12}) \right)^2$$

$$17 \left(\frac{\sqrt{12-17} + \sqrt{17+12}}{\sqrt{12-17}} \right)^2 = 17 \left(\frac{1 - \sqrt{12}}{\sqrt{12-17}} \right)^2 = 17(1-\sqrt{12}) = -t(1-\sqrt{12})$$

$$\boxed{t = 14}$$

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$$a = \sqrt{17-12\sqrt{12}} = \sqrt{1-\sqrt{12}}$$

$$\left(\left(a + \frac{1}{a} \right)^2 - 1 \right)^2 = \left(a^2 + \frac{1}{a^2} + \frac{1}{a^2} + 1 \right)^2 = \left(\frac{1-\sqrt{12}}{1-\sqrt{12}} + 1 \right)^2 = \left(\frac{2(1-\sqrt{12})}{1-\sqrt{12}} \right)^2 = 14 = t$$

$$t = 14 \Rightarrow \boxed{t = 2}$$

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$$A = \sqrt[10]{17} \quad \text{and} \quad 17^{\frac{1}{10}} = 17^{\frac{1}{2} \times \frac{1}{5}} = 17^{\frac{1}{2}} \times 17^{\frac{1}{5}} = 17^{\frac{1}{2}}$$

$$(17^{\frac{1}{10}})^{-\frac{1}{5}} = (17^{\frac{1}{2}})^{-\frac{1}{5}} = \boxed{\frac{1}{17}}$$

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$$\sqrt[10]{a} = 17 \times a^{\frac{10}{17}} \Rightarrow a^{\frac{1}{17}} = a^{\frac{10}{17}} \times 17 \Rightarrow a^{-\frac{1}{17}} = 17 \Rightarrow \frac{1}{a^{\frac{1}{17}}} = 17$$

$$\frac{\frac{1}{a} - 1}{1 + \sqrt{12}} = \frac{17\sqrt{12} - 1}{1 + \sqrt{12}} = \frac{17(\sqrt{12}-1)}{(\sqrt{12}+1)} = \frac{17(\sqrt{12}-1)^2}{2} = \frac{17(11-2\sqrt{12})}{2}$$

$$\boxed{4 - 17\sqrt{12}}$$

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$$(\sqrt{m+a} - \sqrt{m-e})(\sqrt{m+a} + \sqrt{m-e}) = m+a - m+e = a+e$$

$$1(\sqrt{m+a} + \sqrt{m-e}) = a+e \Rightarrow (\sqrt{m+a} + \sqrt{m-e}) = \frac{a+e}{1} = \frac{a}{1} + 1$$

$$\sqrt{m+a} + \sqrt{m-e} - 1 = \frac{a}{1} + 1 - 1 = \boxed{\frac{a}{1}}$$

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