۱.

$\frac{x}{y}=\frac{\sqrt{3}}{4}$ ↓ $x=\frac{\sqrt{3}}{4}y$ ، $S_{\text{اولیه}}=\frac{\sqrt{3}}{4}y^2$

$\frac{x+\alpha}{y}=\frac{1+\sqrt{3}}{2}\to x+\alpha=\frac{1+\sqrt{3}}{2}y$ ↓ $S'=\frac{1+\sqrt{3}}{2}y^2$

$\frac{S'}{S}=\frac{\frac{1+\sqrt{3}}{2}y^2}{\frac{\sqrt{3}}{4}y^2}=\boxed{\cdot/14(1+\sqrt{3})}$

۲.

$\frac{\sqrt{x^2+y^2}}{x}=\frac{1+\sqrt{3}}{2}\to \frac{1+\sqrt{3}}{2}x=\sqrt{x^2+y^2}\to x^2+y^2=\frac{8+2\sqrt{3}}{4}x^2$

$y^2=\left(\frac{3+\sqrt{3}}{2}-1\right)x^2\to \frac{x^2}{y^2}=\frac{2}{1+\sqrt{3}}=\frac{2(1-\sqrt{3})}{1-3}=\boxed{\frac{\sqrt{3}-1}{2}}$

($\frac{1+\sqrt{3}}{2}$)

۳.

$3a+\sqrt{12a^2+12a}=2$ ↓

$\sqrt{12a^2+12a}=2-3a\xrightarrow{()^2}12a^2+12a=4+9a^2-12a\to 3a^2-24a+4=0\to$

$a^2-8a+16=0\to(a-4)(a-2)=0\to a=4>\frac{2}{3}$ غ ق ق

$a=2<\frac{2}{3}$ ✓

$2-3a\geq 0\to 2\geq 3a\to \frac{2}{3}\geq a$

$\frac{a+1}{a}=\frac{\frac{2}{3}+1}{\frac{2}{3}}=\frac{\frac{5}{3}}{\frac{2}{3}}=2.5$

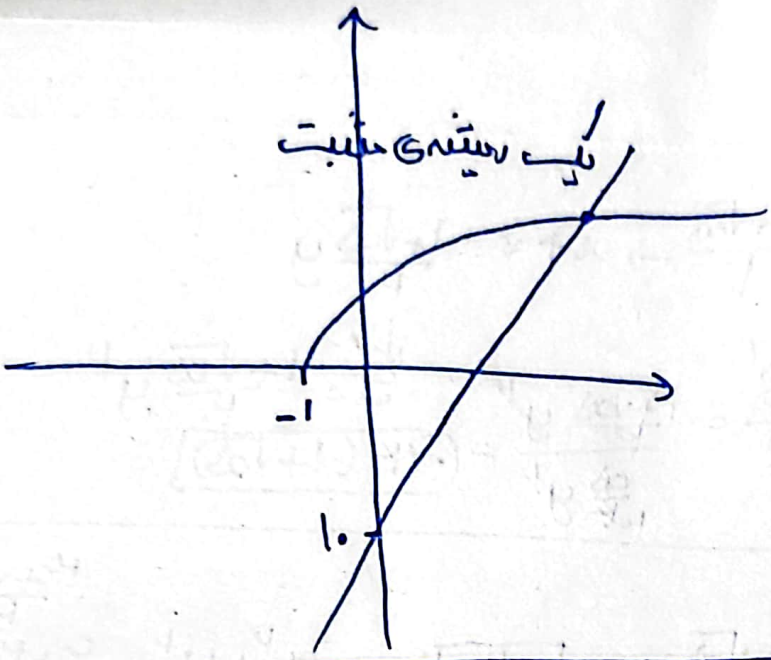
۴.

$\frac{\sqrt{x+1}}{\sqrt{x-1}+3}-\frac{\sqrt{x+1}}{3-\sqrt{x-1}}=\frac{x-1}{\sqrt{x-1}}$

$x-1\geq 0\to x\geq 1$

$x+1\geq 0\to x\geq -1$

$\frac{-x+1+3\sqrt{x+1}-x+1-3\sqrt{x+1}}{x-1-9}=\frac{x-1}{\sqrt{x-1}}\to\frac{-2x+2}{x-10}=\frac{x-1}{\sqrt{x-1}}\to 2\sqrt{x+1}=x-10$



.5

$x=-12$ $x=2$ $\leftarrow x^2+10x-24=0$ $\leftarrow 4-x^2=-20+10x$

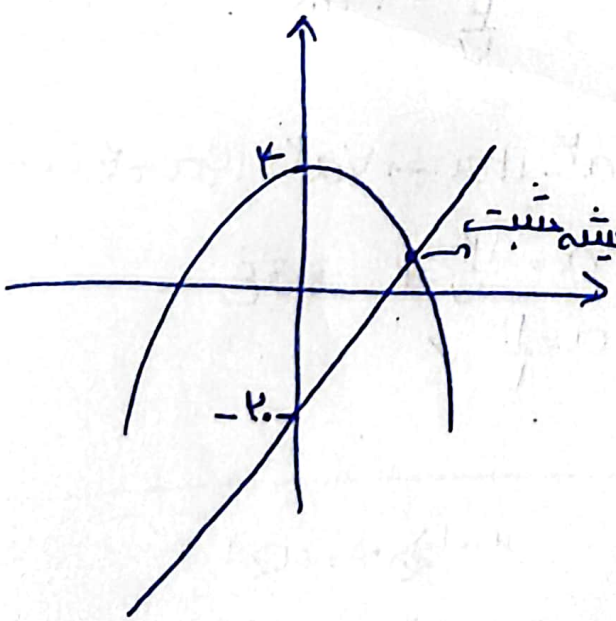
$$\frac{4-\sqrt{2-x}-\sqrt{2-x}-2}{4-2+x}=\frac{-2\sqrt{2-x}}{2+x}=\frac{2-x}{5\sqrt{2-x}}$$

$\rightarrow 4-x^2=-10(2-x)$

صفر جواب مثبت

غ ق ق $x=2$ $\Leftarrow$ یک ریشه مثبت

خرج صفر



6.

$$\frac{\overbrace{x^2+1-2x+x^2}^{2x^2-2x+1}}{\underbrace{x^2(1-x)^2}_{x^4+x^2-2x^3}}=\frac{160}{9}\rightarrow 18x^2-18x+9=160x^4+160x^2-320x^3$$

$$160x^4-320x^3+142x^2+18x-9=0$$

$$x=\frac{1}{4},\ \frac{3}{4}\rightarrow \frac{1}{4}+\frac{3}{4}=(2)$$

7.

$-x^3+4x^2+25x-100\geq 0 \rightarrow 2\leq x\leq 4 \rightarrow$ جواب ← زیر قدر مطلق باید + باشد

$-64+64+100-100=0$ منفی می‌دهد

پس عبارت جواب ندارد به غیر از ۴ که به ازای ۴ صفر می‌شود

$-x^2+6x-8\geq 0 \rightarrow x^2-6x+8\leq 0 \rightarrow (x-4)(x-2)\leq 0 \rightarrow$

	2		4	
+		−		+

8.

$3y+x=17 \rightarrow y=\frac{17-x}{3}$

$y=|x+2|+|x-1| \rightarrow$

	−2		+1	
$-2x-1$		$x+2+1-x = 3$		$2x+1$

$-2x-1=\frac{17-x}{3}\rightarrow x=-4,\ y=7$ ✓

$A\rightarrow(-4,7)$ $\quad AB=\sqrt{(2+4)^2+(7-5)^2}=2\sqrt{10}$

$3=\frac{17-x}{3}\rightarrow x=8$ غ ق ق $-2\leq x\leq 1$ ✗

$2x+1=\frac{17-x}{3}\rightarrow x=2,\ y=5$ ✓ $\quad B\rightarrow(2,5)$

9.

$y=\frac{1}{2}x+2\rightarrow (0,2)\ (8,6)\ (2,3)$

$|x-2|=\frac{1}{2}x+2\rightarrow x=8,\ y=6$

$y=-x+2\rightarrow AH=\frac{|8+6-2|}{\sqrt{2}}=6\sqrt{2}$

$BC=\sqrt{(0-2)^2+(2-0)^2}=2\sqrt{2}$

$\frac{6\sqrt{2}\times 2\sqrt{2}}{2}=12$

$T_{\text{مؤثر}} = T_{\text{مجاور}} - 9$ $\qquad R_{\text{مقاومت}} = \frac{1}{T_{\text{مجاور}}}$ $\qquad B_{\text{مؤثر}} = \frac{1}{T_{\text{مقاومت}} - 9}$

$$\frac{1}{T_F} + \frac{1}{T_F - 9} = \frac{1}{20} \rightarrow 40T_F - 180 = T_F^2 - 9T_F \rightarrow$$

$$T_F^2 - 49T_F + 180 = 0 \rightarrow T_F = 4,\ T_F = 45$$

$T_B = 4 - 9 = -5$ غیرقابل قبول

$T_B = T_F - 9 = 45 \rightarrow$ مگاهرتز