1. $5\sqrt{2}\left(x+\sqrt{10}\right)-10\sqrt{5}\left(1+x\sqrt{5}\right)-5\left(\sqrt{2}-10\right)=0$

$5x\sqrt{2}+10\sqrt{5}-10\sqrt{5}-50x-5\sqrt{2}+50=0$ $\qquad 5x\left(\sqrt{2}-10\right)=5\left(\sqrt{2}-10\right)$ $\qquad \boldsymbol{x=1}$

2. $\frac{x\sqrt{3}+1}{x^2+x\sqrt{3}}-\frac{3-x\sqrt{3}}{x^2-x\sqrt{3}}=\frac{2\sqrt{3}}{x}$

$\frac{x\sqrt{3}+1}{x\left(x+\sqrt{3}\right)}-\frac{-\sqrt{3}\left(x-\sqrt{3}\right)}{x\left(x-\sqrt{3}\right)}-\frac{2\sqrt{3}}{x}=0$ $\qquad C.A.:\ x\neq 0 \ \wedge\ x\neq \pm\sqrt{3}$

$\frac{x\sqrt{3}+1}{x\left(x+\sqrt{3}\right)}-\frac{\sqrt{3}}{x}=0$ $\qquad \frac{x\sqrt{3}+1-x\sqrt{3}-3}{x\left(x+\sqrt{3}\right)}=0$ $\qquad 0x=2$ $\qquad \boldsymbol{\nexists x\in\mathbb{R}}$

3. $x^2+\left(\sqrt{3}-2\sqrt{2}\right)x-2\sqrt{6}=0$

$x^2+x\sqrt{3}-2x\sqrt{2}-2\sqrt{6}=0$ $\qquad x\left(x+\sqrt{3}\right)-2\sqrt{2}\left(x+\sqrt{3}\right)=0$

$\left(x+\sqrt{3}\right)\left(x-2\sqrt{2}\right)=0$ $\qquad \boldsymbol{x=-\sqrt{3}\ \vee\ x=2\sqrt{2}}$

4. $\begin{cases} x\sqrt{3}+y=1 \\ x=y\sqrt{3}-\sqrt{3} \end{cases}$

$\begin{cases} 3x+y\sqrt{3}=\sqrt{3} \\ x-y\sqrt{3}=-\sqrt{3} \end{cases}$

$4x=0$ $\qquad \boldsymbol{\begin{cases} x=0 \\ y=1 \end{cases}}$

5. $\begin{cases} -x\sqrt{3}+x<1-\sqrt{3} \\ \frac{5x\sqrt{2}}{2\sqrt{3}}-\frac{3}{\sqrt{6}}>\frac{3x\sqrt{6}}{2} \end{cases}$

$\begin{cases} x\left(1-\sqrt{3}\right)<1-\sqrt{3} \\ 10x-6>18x \end{cases}$ $\qquad \begin{cases} x>1 \\ x<-\frac{3}{4} \end{cases}$ $\qquad \boldsymbol{\nexists x\in\mathbb{R}}$

6. $\frac{x+2}{x-\sqrt{3}}<\frac{1}{1+\sqrt{3}}$

$\frac{x+x\sqrt{3}+2+2\sqrt{3}-x+\sqrt{3}}{\left(1+\sqrt{3}\right)\left(x-\sqrt{3}\right)}<0$ $\qquad \frac{x\sqrt{3}+2+3\sqrt{3}}{x-\sqrt{3}}<0$

$N>0:\quad x>-\frac{2\sqrt{3}}{3}-3$

$D>0:\quad x>\sqrt{3}$

	$-3-\frac{2\sqrt{3}}{3}$	$\sqrt{3}$
$-$	$+$	$+$
$-$	$-$	$+$
$+$	$-$	$+$

$\boldsymbol{-3-\frac{2\sqrt{3}}{3}<x<\sqrt{3}}$

7. $\left| x\sqrt{2}-3 \right| = 3-x$

$$\begin{cases} x\sqrt{2}-3 \geq 0 \\ x\sqrt{2}-3 = 3-x \end{cases} \qquad \begin{cases} x\sqrt{2}-3 < 0 \\ x\sqrt{2}-3 = -3+x \end{cases}$$

$$\begin{cases} x \geq \frac{3\sqrt{2}}{2} \\ x(\sqrt{2}+1) = 6 \end{cases} \quad x = \frac{6}{\sqrt{2}+1} = \mathbf{6(\sqrt{2}-1)} \qquad \begin{cases} x < \frac{3\sqrt{2}}{2} \\ x(\sqrt{2}-1) = 0 \end{cases} \quad x = \mathbf{0}$$

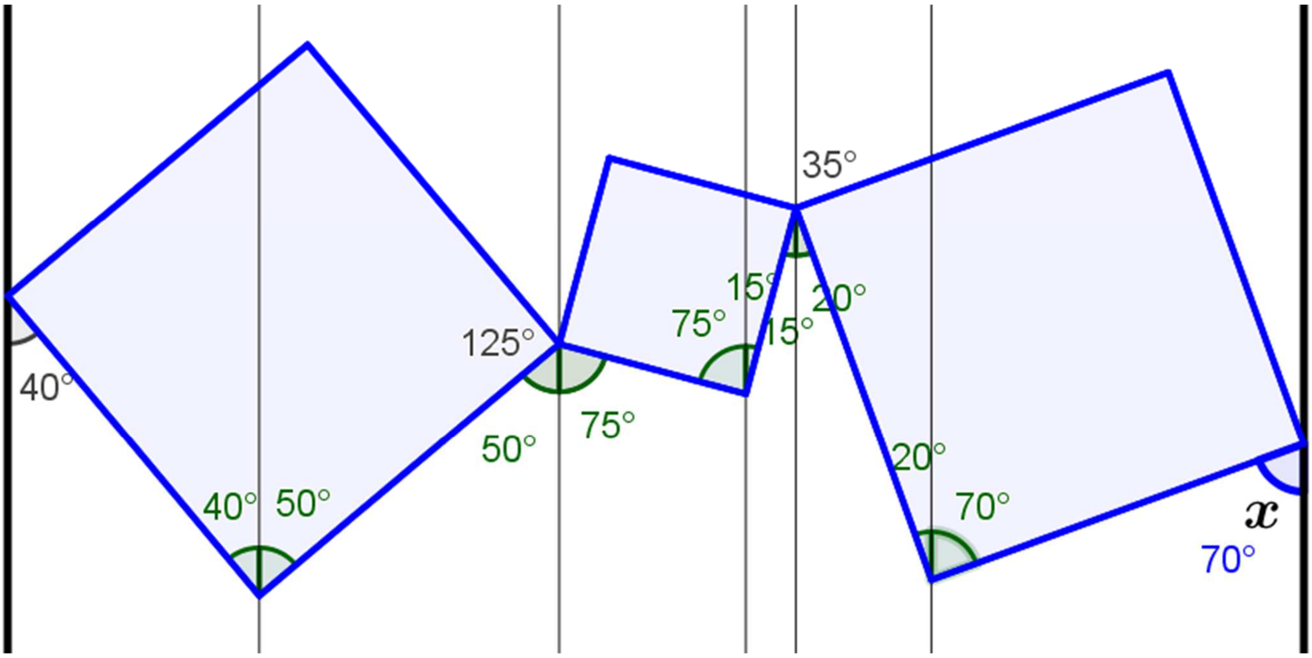
8. Semplifica la seguente espressione utilizzando, quando è possibile, le proprietà delle potenze:

$$2^{-1}\left[\left(2^{\frac{1}{2}}+3^{\frac{1}{2}}\right)^{-1}+\left(3^{\frac{1}{2}}-2^{\frac{1}{2}}\right)^{-1}\right] : 3^{-\frac{1}{2}}$$

$$\frac{1}{2}\left(\frac{1}{2^{\frac{1}{2}}+3^{\frac{1}{2}}}+\frac{1}{3^{\frac{1}{2}}-2^{\frac{1}{2}}}\right) : \frac{1}{3^{\frac{1}{2}}} = \frac{1}{2}\cdot\frac{3^{\frac{1}{2}}-2^{\frac{1}{2}}+2^{\frac{1}{2}}+3^{\frac{1}{2}}}{\left(3^{\frac{1}{2}}-2^{\frac{1}{2}}\right)\left(3^{\frac{1}{2}}+2^{\frac{1}{2}}\right)}\cdot 3^{\frac{1}{2}} = \frac{1}{2}\cdot\frac{2\cdot 3^{\frac{1}{2}}}{3-2}\cdot 3^{\frac{1}{2}} = 3^{\frac{1}{2}+\frac{1}{2}} = \mathbf{3}$$

9. Tre quadrati sono posti tra due linee parallele come indicato in figura. Determina l'ampiezza dell'angolo x.

Si tratta semplicemente di applicare le proprietà dei fasci di rette parallele tagliate da una trasversale e di stabilire i valori degli angoli alterni interni, facendosi aiutare dagli angoli retti dei quadrati:



L'angolo x ha ampiezza **70°**.