Soluție

1. $f(-1)=0 \Rightarrow a=\sqrt{2}$

$x+1\le\sqrt{2}x+\sqrt{2} \Leftrightarrow \left(1-\sqrt{2}\right)x\le\sqrt{2}-1 \Leftrightarrow x\ge -1 \Leftrightarrow x\in\left[-1;\infty\right)$

2.a) $f(x)=x^2-2x$,deci axa de simetrie are ecuația $x=1$,rezultă $f\left(1-x\right)=f\left(1+x\right)\ \forall x\in\mathbb{R}$

$f\left(1+3,75\right)=f\left(1-3,75\right)\Rightarrow f\left(4,75\right)=f\left(-2,75\right)$

b) axa de simetrie $x=-\dfrac{b}{2a}\Rightarrow x=-\dfrac{m}{2}$,deci $m=-2$

$f(2)=4+2m+2n \Leftrightarrow 0=4-4+2n \Leftrightarrow n=0$

3. $a=2>0\Rightarrow$ funcția admite minim

f strict descrescatoare pe $\left(-\infty;-\dfrac{b}{2a}\right]=\left(-\infty;\dfrac{3}{2}\right]$ **și** f strict crescatoare pe $\left[-\dfrac{b}{2a};\infty\right)=\left[\dfrac{3}{2};\infty\right)$

4. a) $2^{x^2-3x}=2^{-2} \Leftrightarrow x^2-3x=-2 \Leftrightarrow x^2-3x+2=0 \Leftrightarrow x\in\{1;2\}$

b) $\log_2(x^3-19)=3\Rightarrow x^3-19=8\Rightarrow x=3$ si verificare