4) To compare a and b, we square both of them:

$a^2 = \left(-\frac{\sqrt{2+\sqrt{3}}}{2}\right)^2$

$= \frac{2+\sqrt{3}}{4}$ $(2+\sqrt{3} > 0)$ ✓

$b^2 = \left(\frac{\sqrt{2}+\sqrt{6}}{4}\right)^2$

$= \frac{8+2\sqrt{2^2\times 3}}{16}$

$= \frac{8+4\sqrt{3}}{16} = \frac{4(2+\sqrt{3})}{16} = \frac{2+\sqrt{3}}{4}$

$a^2 = b^2 = \frac{2+\sqrt{3}}{4}$

So, $a^2 - b^2 = 0$ (the difference of 2 equal nbs is 0)

then, $(a+b)(a-b) = 0$ but a is negative

So, $\boxed{a = -b}$ (True)

5) for P(x) to be 3rd degree, the leading coefficient shouldn't be zero.

So, $(m^2-3) \neq 0$

$(m-\sqrt{3})(m+\sqrt{3}) \neq 0$

So, $m \neq \sqrt{3}$ and $m \neq -\sqrt{3}$ for P(x) to be a 3rd degree trinomial

then P(x) is a 3rd degree polynomial for all real values of m except for $m=\sqrt{3}$ & $m=-\sqrt{3}$.

(False)