Does a polynomial maximising algorithm imply a polynomial minimising algorithm?

Optimisation problems come in two flavours: maximisation and minimisation. Among these, some are polynomially solvable. Polynomially solvable optimisation problems can be said to form a class P_{opt}. Thus $P_{opt} = P_{max} \cup P_{min}$, where P_{max} (P_{min}) is the class of polynomially solvable maximisation (respectively, minimisation) problems. Of course, $P_{max} \cap P_{min} = \varnothing$.

For a problem $P \in P_{opt}$, let P' be the dual of P.

a) If $P \in P_{max}$, is $P' \in P_{min}$ always? (In other words, is P' also always polynomially solvable?)
b) Is the opposite always true – if $P \in P_{min}$, is $P' \in P_{max}$ always?
c) Are both (a) and (b) true always? In other words, is P_{opt} closed under duality?

Are there any results known on these problems?

Same "problem" as above, but let the optimisation problems be *polynomially bounded* | that is, the optimal solution value is bounded by a polynomial in the size of the problem instance.

Prabhu Manyem,
University of Ballarat,
Australia.