Karp Reductions

Suppose you have two decision problems, π and π'.
Suppose $\pi' \in \mathcal{P}$, and that $\mathcal{A}$ is a polynomial time algorithm to solve π'.
Suppose we have a function F that maps inputs to π to inputs to π', so that:

- YES-instances of π map to YES-instances of π'
- NO-instances of π map to NO-instances of π'
- The function F takes polynomial time to compute
- The size of $F(I)$ is polynomial in the size of I for any input I

Such a function F is called a *Karp* reduction, after Dick Karp (Berkeley) who came up with them.