Problem 6

In quick sort, normally, we recursively call the quick sort and put 2 parts of the array as input.

This time, we using find-median which is $\Theta(n^2)$ to find pivot. And seperate the array into two equal length parts.

Then we have $T(n) = \Theta(n^2) + 2T(\frac{n}{2})$

This implies that $T(n) = \sum_{i=0}^{\log n} 2^i \cdot \Theta(n^2) = \Theta(n^2) \cdot \Theta(2^{\log n}) = \Theta(n^3)$