Problem of the Day

Problem: Given an array-based heap on $n$ elements and a real number $x$, efficiently determine whether the $k$th smallest element in the heap is greater than or equal to $x$.

Your algorithm should be $O(k)$ in the worst-case, independent of the size of the heap.

Hint: you do not have to find the $k$th smallest element; you need only determine its relationship to $x$. 