NAME: _____ **Panther ID:** _____

Spring Break homework – Due Thursday, March 23 - MAC 2312, Spring 2017

1. (10 pts) It follows from Coulomb's law in physics that two like electrostatic charges repel each other with a force inverse proportional to the square of the distance between them. Suppose that two charges A and B repel with a force of k Newtons when they are positioned at points $A(-a, 0)$ and $B(a, 0)$, where a is measured in meters. Find the work W required to move charge A along the x-axis to the origin if the charge B remains stationary.

2. (10 pts) The integrals below occur naturally in electrostatics. Compute them (assume that b is a given constant).

(a) $\displaystyle\int \frac{x}{(x^2+b^2)^{3/2}}\,dx$ (b) $\displaystyle\int \frac{1}{(x^2+b^2)^{3/2}}\,dx$

Hint: For one integral you need a trig substitution. The other can be done much faster.