

# Math 134

Quiz 6 Sample

March 23, 2011

You may use your calculator and integral tables. Indicate any calculations you do with the calculator and which formula you use from the tables and show your algebra whenever calculations are done by hand.

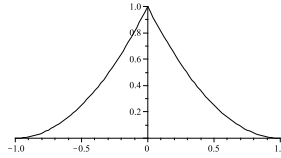


Figure 1:

1. A function  $f$  (graphed in Figure 1) is defined by:

$$f(x) = \begin{cases} (x+1)^2 & -1 \leq x \leq 0 \\ (x-1)^2 & 0 \leq x \leq 1 \end{cases}$$

Find the center of mass of the region below the graph of  $f$  and above the  $x$ -axis for  $-1 \leq x \leq 1$ . (*Hint:* Use symmetry where possible.)

2. A spring whose natural length is 10 cm exerts a force of 0.5 N when stretched 5 cm beyond its natural length.
- (a) Find the spring constant  $k$ .
  - (b) How much work is required to stretch the spring from its natural length to a length of 18 cm?