

5. (16 points) A furniture manufacturer has determined when  $x$  hundred wooden chairs are built, the average cost per chair is given by the function

$$y = C(x) = 0.1x^2 - 0.7x + 1.625$$

where  $C(x)$  is in hundreds of dollars.

a. Write the function in vertex (or  $a-h-k$ ) form.

$$C(x) = 0.1x^2 - 0.7x + (1.625)^2$$

$$C(x) = 0.1x^2 - \left(\frac{1}{2}(0.7x)\right) + (1.625)^2$$

$$C(x) = 0.1x^2 - 0.35x + 2.641$$

$$C(x) = a(x-h)^2 + k$$

$$C(x) = 0.1(x^2 - 3.5x) + 0.4$$

b. Find the number of chairs that should be built to minimize the average cost per chair. What is the minimum average cost per chair?

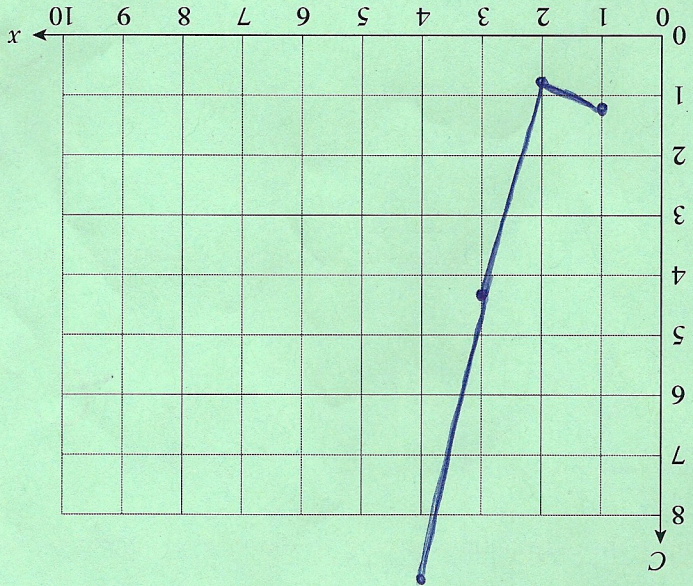
The minimum cost is

$$C(x) = 0.1(1)^2 - 3.5(1) + 0.4$$

$$C(1) = 1.025$$

10

4



c. Sketch a graph of the average cost function on the axes below.