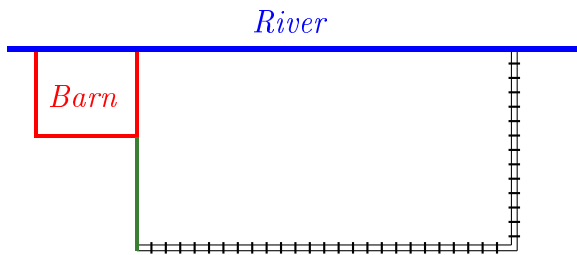


1. (6) A rancher wishes to build a rectangular pen for his livestock. He plans to build one edge along a river, and also use an existing 50 foot barn as a portion of the perimeter of the pen. He will construct the side which is parallel to the river, as well as the side which is opposite the barn, out of fencing which costs \$3 per foot. The remaining side (adjacent to the barn) will be a hedge which costs \$4 per foot. If he plans to spend \$4000 in order to build the pen, how long should the hedge be in order to maximize the area of the enclosure? *No fencing nor hedge is needed along the river or barn.*



2. (6) Alaina (from the example that was done in class, and example 2 in the textbook) is now returning from her trip and must walk home from the bus stop. Unfortunately, the ground is wet from some recent rain, so she will have to walk slower. Alaina needs to travel 2000 feet east and 600 feet south to get home. She can now walk along the sidewalk bordering the park at 5 feet per sec, and through the grassy park at 3 ft/sec. What is the minimum amount of time that it will take Alaina to reach her home from the bus stop?

3. (4) Find the critical point(s) of $g(t) = \frac{-1}{\alpha + (t - \beta)^2}$, given that $\alpha > 0$. Use the first derivative test to classify the critical points.

4. (4) Find and classify the critical point(s) of $f(x) = bxe^{-ax}$, with $a, b > 0$.