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- Find all stationary points (by finding the derivative and setting it to zero).
- Find all singular points.
- Find the endpoints (these are often given).
- Compared values at all of these points - the largest is

the max and the smallest is the min.

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Example 1. *Suppose advertising costs \$1000 per unit (say for magazine adds), and product development costs \$20000 per unit. Suppose that the profits generated from* x *units of advertising and* y *units of product development are* xy^2 *thousands of dollars. If a company has \$10000 to spend on advertising and product development together, how should the money be allocated in order to maximize profits?*

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- Use our optimization techniques above to find the minimum or maximum of the appropriate variable.

Example 2. *Farmer Fred has 100ft of fencing to use to enclose his sheep in a rectangular area next to a river. What is the largest area which he can enclose?*

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Example 3. *Suppose the top and bottom of a box is made of a metal which costs 10 cents per square centimeter and the sides are made of a metal which costs 12 cents per square centimeter.*

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Example 3. *Suppose the top and bottom of a box is made of a metal which costs 10 cents per square centimeter and the sides are made of a metal which costs 12 cents per square centimeter. What is the largest volume can which can be made from two dollars of material?*

Example 4. *Suppose the daily production level at a factory is modeled by a Cobb-Douglas production function* $P = L^{0.7}C^{0.3}$*, where* L *is the number of workers and* C *is the cost of materials measured in thousands of dollars.*

Example 4. *Suppose the daily production level at a factory is modeled by a Cobb-Douglas production function* $P = L^{0.7}C^{0.3}$*, where* L *is the number of workers and* C *is the cost of materials measured in thousands of dollars. If each worker costs the company \$200 per day, what is the maximum production level which can be achieved with a total cost of \$10000 per day.*