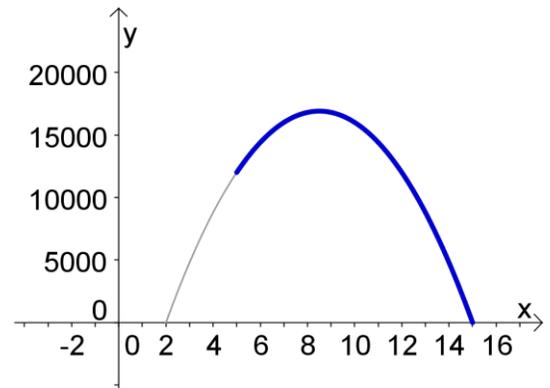
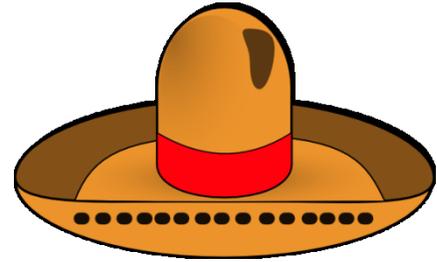


## Additional Applied Optimization

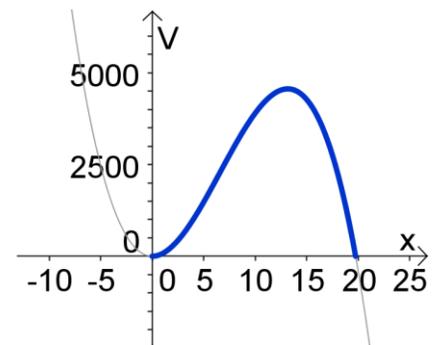
**Ex 1.**

Happy Sombreros can produce hats at a cost of \$2 per hat. The hats have been selling for \$5 each, and at this price, tourists have been buying 4,000 hats a month. The manufacturer is planning to raise the price of hats and estimates that for each \$1 increase in the price, 400 fewer hats will be sold each month. At what price should Happy Sombreros sell the hats to maximize profit?



**Ex 2.**

If you send a package via USPS Express Mail International, the length plus the girth (distance around thickest part) can't be more than 79 inches. What's the largest possible volume of a rectangular box with two square sides that can be sent by USPS Express Mail International? And what are the dimensions of the box?



**Ex 3.**

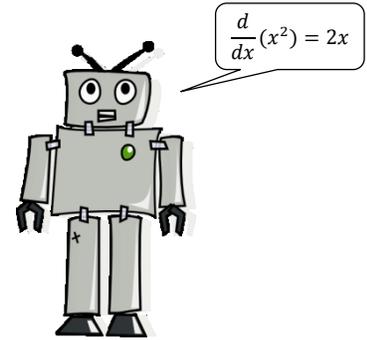
An open box with a square base is going to be made. The sides of the box will cost \$3 per square foot, and the base will cost \$5 per square foot. What are the dimensions of the box with the largest volume that can be constructed for \$60?

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**Practice**

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1. Calcubot sells robots that can answer calculus questions by simply asking them outloud. They cost \$50 per robot to make, and are sold for \$150 per robot. At this price, they have been selling 100 robots per month. The owner of Calcubot is planning to lower her price, and estimates that for each \$5 reduction in price, 10 more robots will be sold each month. At what price should the robots be sold to maximize profit?



Q: A man is driving his son to school. They get into an accident and the man dies. The son is rushed to the hospital and when he arrives for emergency surgery the doctor says "I can't operate on this boy, HE'S MY SON!" The boy was not adopted. How is this possible?