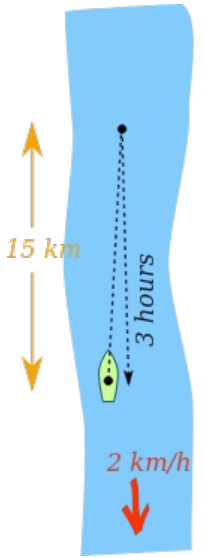
1: A 3 hour river cruise goes 15 km upstream and then back again. The river has a current of 2 km/h. What is the boat's speed and how long was the upstream journey?

2: Find roots:

$$2x^2 + x - 1$$

total time = 15/(x−2) + 15/(x+2) = 3 hours



4: What is min of quadratic expression?

$$4x^2 - 4x$$

6: Find solutions:

$$|2 - x| \leq 1$$

and

$$|x + 2| < |x - 1|$$

7: Find all real x such that

$$\sqrt{x-1} + \sqrt{x+4} = 5$$

8: Find solutions with dependence on real parameter a:

$$a^2x - x + a = 1$$

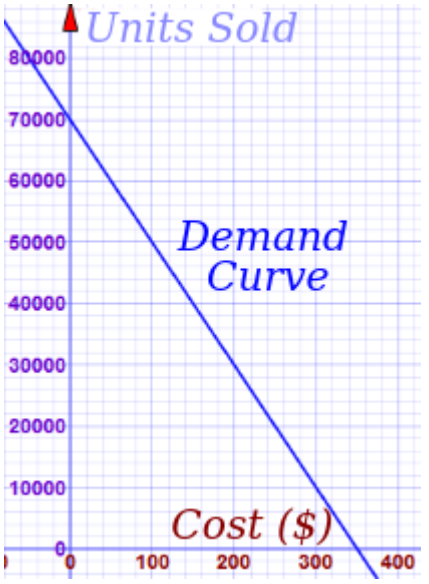
9: Find solutions:

s) $|x + 2| = 4|x - 3|$

t) $x^2 + |x - 1| - 1 = 0$

You have designed a new style of sports bicycle and you want to sell them with maximal profit. Your costs are going to be:
$700,000 for manufacturing set-up and advertising and $110 to make each bike.

Based on similar bikes, you can expect sales to follow this "Demand Curve":
Unit Sales = 70,000 − 200P, where P is the price.



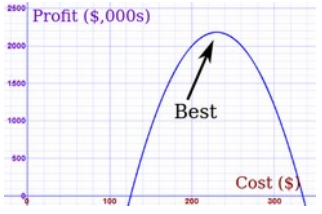
So what is the best price? And how many should you make?

Dollar Sales = Units × Price
Costs = ?

Profit = Sales − Costs = ?

Maximum of Profit = ?

- Profit = Sales − Costs = 70,000P − 200P2 − (8,400,000 − 22,000P) = −200P2 + 92,000P − 8,400,000
- P^2 – 460P + 42000 = 0
- P = 230 ± 104 = 126 or 334 but it gives us break-point..



Unit Sales = 70,000 − 200 x 230 = 24,000
Sales in Dollars = $230 x 24,000 = $5,520,000
Costs = 700,000 + $110 x 24,000 = $3,340,000
Profit = $5,520,000 − $3,340,000 = $2,180,000