## Profit vs. Cost Notes
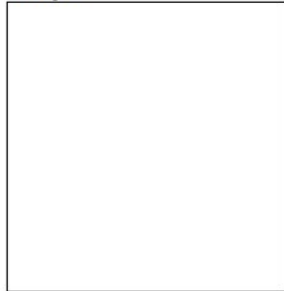
A rookie baseball player has an offer to sign a contract for $200,000 per year for 4 years. The player can add years to the deal, but for each additional year, he will make $10,000 less. How many years should the player structure in his contract to maximize his ~~yearly~~ total salary? Calculate his maximum total salary.

Diagram:

Equation A: ~~(given info)~~

Equation A: (new version)

$$T = 800,000 + 160,000x - 10,000x^2$$

Equation B: _____ (max/min)

Equation B: _____ (new version)

Equation B: (1st derivative)

$$T' = 160,000 - 20,000x = 0$$

$$160,000 = 20,000x$$

$$\boxed{8 = x}$$

Number of Years: **12**

Total Salary: **$1,440,000**

$ Per Year: **$120,000**

| # YEARS | $ PER YEAR | TOTAL $ |
|---------|-----------|---------|
| 4 | $200,000 → | $800,000 |
| 5 | $190,000 → | $1,950,000 |
| 6 | $180,000 | $1,080,000 |

$$(4+x) \cdot (200,000 - 10,000x) \rightarrow \text{FOIL}$$

$$T = (4+x)(200,000 - 10,000x)$$

$$T = 800,000 - 40,000x + 200,000x - 10,000x^2$$

$$T = 800,000 + 160,000x - 10,000x^2$$