

Lab 8: Simple linear interpolation problem

The time it takes to make a marshmallow peep at Just Born Candy in Bethlehem has decreased steadily since 1953. During the same time period the demand for the candy has steadily increased.

The following data are possible facts about the fast growing peep industry!

Year	Peeps demand/yr	Time to make a peep(hrs)
1953	0	27.0
1960	500,000	5.0
1970	1,500,000	1.0
1980	450,000,000	0.45
1990	750,000,000	0.23
2001	1,100,000,000	0.10

Using linear interpolation, determine the peep demand and the time to make a peep in 1964 and 1996.

How many significant figures do you think each result should have?

Solution

Use the formula given in lecture:

$$y_{\text{interp}} = y_{\text{lo}} + \left(\frac{x_{\text{interp}} - x_{\text{lo}}}{x_{\text{hi}} - x_{\text{lo}}} \right) * (y_{\text{hi}} - y_{\text{lo}})$$

1964

$$y_{1964} = y_{1960} + \left(\frac{x_{1964} - x_{1960}}{x_{1970} - x_{1960}} \right) * (y_{1970} - y_{1960})$$

$$\begin{aligned} y_{1964} &= 500,000 + \left(\frac{1964 - 1960}{1970 - 1960} \right) \\ &\quad * (1,500,000 - 500,000) \end{aligned}$$

$$y_{1964} = 900,000$$

Solve similarly for all other questions.

Year	Peeps demand/yr	Time to make a peep(hrs)
1964	900,000	3.4
1996	940,909,091	0.16