

Aim: How can we use technology to find a polynomial function to fit given data points in a contextual situation? – Part 1 (Section 5-8)

Do Now: Find a polynomial function whose graph passes through each set of points: $(-4, 31)$, $(2, 25)$, and $(0, 3)$

Remember (x,y)

Hint: Use the calculator to try to find the best fit line. Use 3 different regressions: Linear, Quadratic and Cubic.

I- The $(n+1)$ Point Principle

- 1) X number of non-collinear points determines a Polynomial Function of degree $X-1$.
- 2) If you have 4 non-collinear points then the degree of the Polynomial Function is 3
- 3) $(-4, 31)$, $(2, 25)$ and $(0, 3)$ Determine a Polynomial Function of degree 2
- 4) $y = ax^2 + bx + c$
- 5) Replace each coordinate point to get 3 linear equations in 3 unknowns.

$$Y = ax^2 + bx + c$$

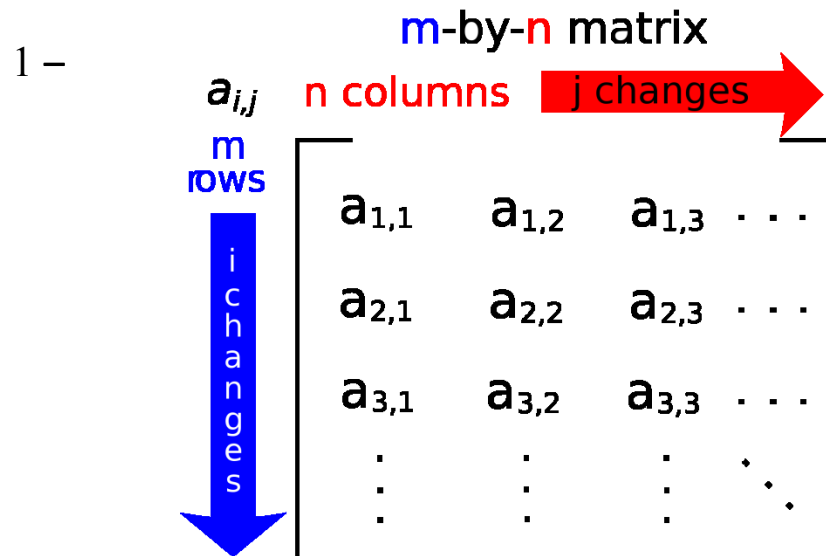
For $(-4, 31)$

$$31 = a(-4)^2 + b(-4) + c$$

Continue... for $(2, 25)$ and $(0,3)$

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II – Matrices



2- Use Matrices to Solve System of Equations

For example

$$\begin{aligned} -4x + y &= 6 \\ -5x - y &= 21 \end{aligned}$$

Let's use the calculator matrix package...

3- Let's go back to our problem

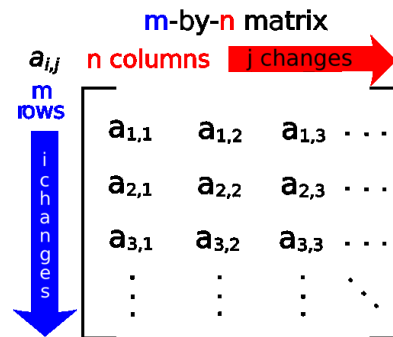
$$\begin{aligned} 31 &= a(-4)^2 + b(-4) + c \\ 25 &= a(2)^2 + b(2) + c \\ 3 &= a(0)^2 + b(0) + c \end{aligned}$$

Aim: How can we use technology to find a polynomial function to fit given data points in a contextual situation? – Part 1 (Section 5-8)

$$31 = 16a - 4b + 1c$$

$$25 = 4a + 2b + 1c$$

$$3 = 0a + 0b + 1c$$



II- A Geometric Interpretation (use the calculator)

- 1) Let's Use a Graph to probe that a quadratic regression is the best fit
- 2) Lets' use a quadratic regression to get the quadratic equation.