

1. (a) Find the best fit line $y = mx + b$ for the data points

x	1	1.5	2	3	3.1	3.2	4
y	8	9	15	10	18	23	19

- (b) Use the site

<https://www.socscistatistics.com/tests/regression/> to find the least squares regression line for this data. Compare your answer to part (a).

2. Let $A = \begin{bmatrix} 1 & -18 \\ -3 & 4 \end{bmatrix}$, $\vec{v}_1 = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$, $\vec{v}_2 = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$, $\lambda_1 = 10$, $\lambda_2 = -5$

- (a) Show that A has eigenvalues λ_1, λ_2 with corresponding eigenvectors \vec{v}_1, \vec{v}_2

- (b) Let $P = [\vec{v}_1 \ \vec{v}_2]$, the 2×2 matrix with columns \vec{v}_1 and \vec{v}_2 . Compute AP

- (c) Let D be the 2×2 diagonal matrix with λ_1 and λ_2 on the diagonal. Compute PD

- (d) Compute PDP^{-1} . Ponder