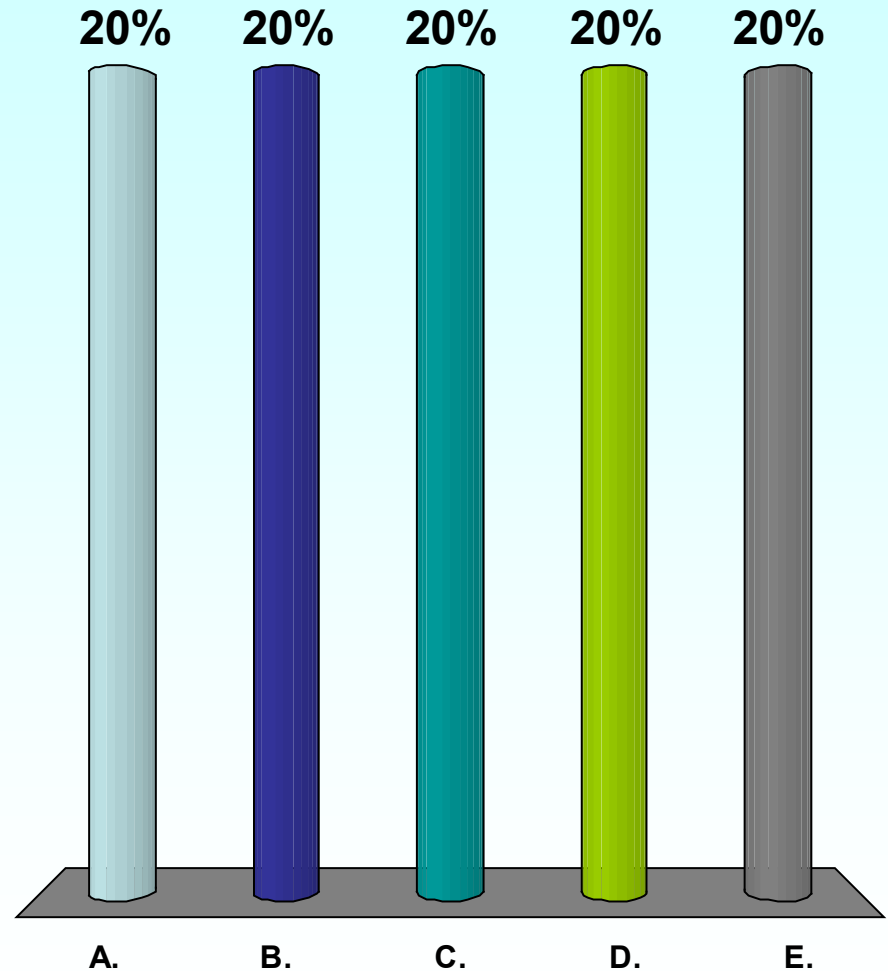


Simultaneous Linear Equations

The name of the person in the picture is



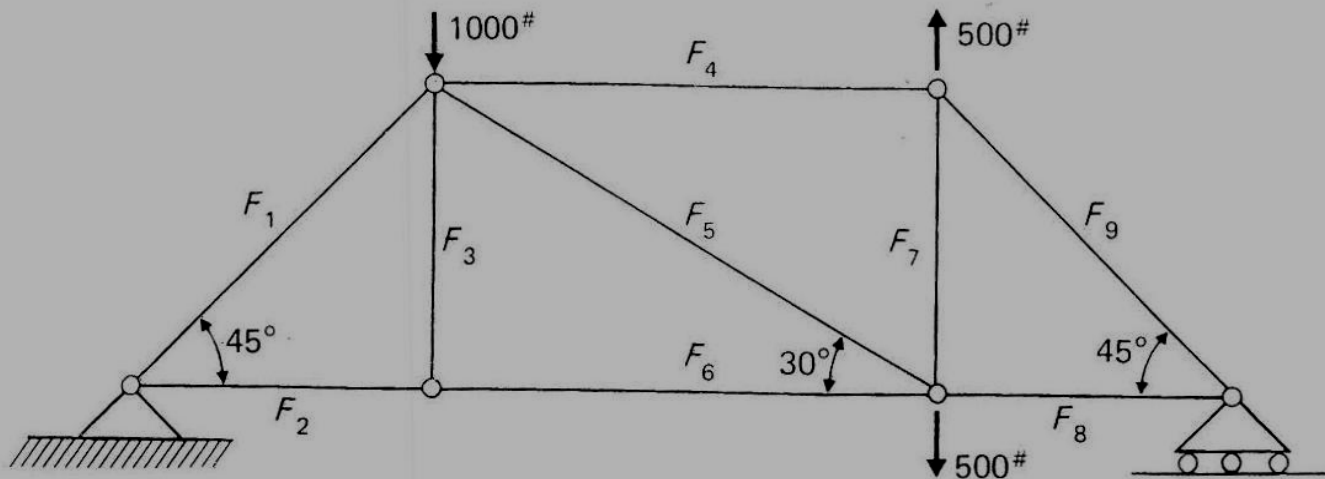
- A. A\$AP Rocky
- B. Kid Cudi
- C. MC Hammer
- D. Scooter
- E. Vanilla Ice



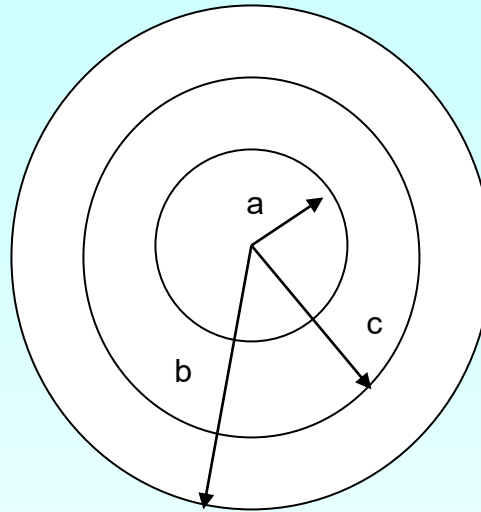
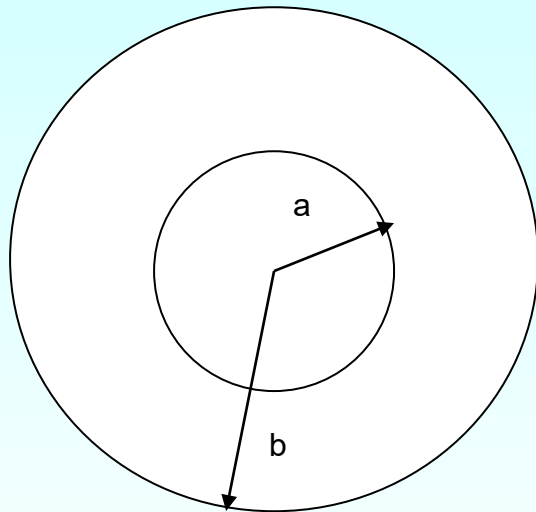
PHYSICAL PROBLEMS

Truss Problem

$$\begin{bmatrix}
 0.7071 & 0 & 0 & -1 & -0.8660 & 0 & 0 & 0 & 0 \\
 0.7071 & 0 & 1 & 0 & 0.5 & 0 & 0 & 0 & 0 \\
 0 & 1 & 0 & 0 & 0 & -1 & 0 & 0 & 0 \\
 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0.7071 \\
 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & -0.7071 \\
 0 & 0 & 0 & 0 & 0.8660 & 1 & 0 & -1 & 0 \\
 0 & 0 & 0 & 0 & -0.5 & 0 & -1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0.7071
 \end{bmatrix} F = \begin{bmatrix} 0 \\ -1000 \\ 0 \\ 0 \\ 500 \\ 0 \\ 0 \\ -500 \\ 0 \end{bmatrix}$$



Pressure vessel problem



$$u_1 = c_1 r + \frac{c_2}{r}$$

$$u_2 = c_3 r + \frac{c_4}{r}$$

$$\begin{bmatrix} 4.2857 \times 10^7 & -9.2307 \times 10^5 & 0 & 0 \\ 4.2857 \times 10^7 & -5.4619 \times 10^5 & -4.2857 \times 10^7 & 5.4619 \times 10^5 \\ -6.5 & -0.15384 & 6.5 & 0.15384 \\ 0 & 0 & 4.2857 \times 10^7 & -3.6057 \times 10^5 \end{bmatrix} \begin{bmatrix} c_1 \\ c_2 \\ c_3 \\ c_4 \end{bmatrix} = \begin{bmatrix} -7.887 \times 10^3 \\ 0 \\ 0.007 \\ 0 \end{bmatrix}$$

Polynomial Regression

We are to fit the data to the polynomial regression model

$$(T_1, \alpha_1), (T_2, \alpha_2), \dots, (T_{n-1}, \alpha_{n-1}), (T_n, \alpha_n)$$

$$\alpha = a_0 + a_1 T + a_2 T^2$$

$$\begin{bmatrix} n & \left(\sum_{i=1}^n T_i \right) & \left(\sum_{i=1}^n T_i^2 \right) \\ \left(\sum_{i=1}^n T_i \right) & \left(\sum_{i=1}^n T_i^2 \right) & \left(\sum_{i=1}^n T_i^3 \right) \\ \left(\sum_{i=1}^n T_i^2 \right) & \left(\sum_{i=1}^n T_i^3 \right) & \left(\sum_{i=1}^n T_i^4 \right) \end{bmatrix} \begin{bmatrix} a_0 \\ a_1 \\ a_2 \end{bmatrix} = \begin{bmatrix} \sum_{i=1}^n \alpha_i \\ \sum_{i=1}^n T_i \alpha_i \\ \sum_{i=1}^n T_i^2 \alpha_i \end{bmatrix}$$

END