ATENSIDEN

FISIKA

VEKTOR

OPERASI VEKTOR

NO. 21

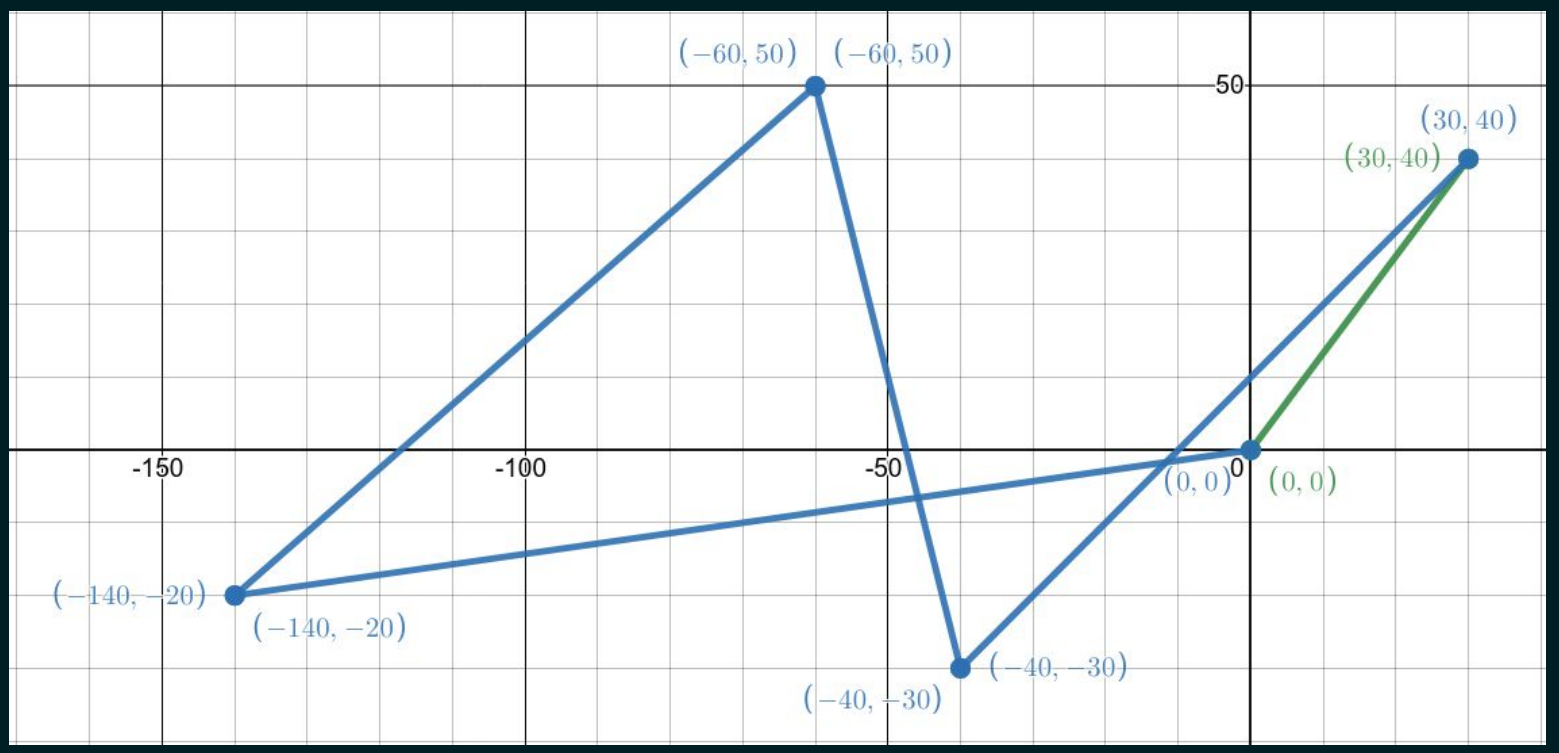
ATENSIDEN

FISIKA

••21 GO An ant, crazed by the Sun on a hot Texas afternoon, darts over an xy plane scratched in the dirt. The x and y components of four consecutive darts are the following, all in centimeters: (30.0, 40.0), (b_x, −70.0), (−20.0, c_y), (−80.0, −70.0). The overall displacement of the four darts has the xy components (−140, −20.0). What are (a) b_x and (b) c_y? What are the (c) magnitude and (d) angle (relative to the positive direction of the x axis) of the overall displacement?

- **Diketahui**
  - **Seekor semut menempuh suatu lintasan pada bidang xy**
  - **Lintasan tsb. dapat dinotasikan sebagai vektor**
  - **A = (30, 40) cm**
  - **B = (bx, -70) cm**
  - **C = (-20, cy) cm**
  - **D = (-80, -70) cm**
  - **Total perpindahan semut tersebut adalah (-140, -20) cm terhadap titik awal**
- **Ditanya**
  - **Berapa nilai komponen bx dan cy?**
  - **Berapa besar perpindahan semut tsb.?**
  - **Berapa besar sudut perpindahan semut tsb. terhadap sb-x positif?**

- Solusi



$$\begin{bmatrix} A \\ B \\ C \\ D \end{bmatrix} = \begin{bmatrix} 30 & 40 \\ b_x & -70 \\ -20 & c_y \\ -80 & -70 \end{bmatrix}$$

$$[R] = [-140 \quad -20]$$

$$140 = 30 + b_x - 20 - 80$$
$$b_x = -70 \ \mathbf{cm}$$

$$-20 = 40 - 70 + c_y - 70$$
$$c_y = 80 \ \mathbf{cm}$$

- Solusi

$$\left\|\vec{R}\right\| = \sqrt{(-140)^2 + (-20)^2}$$

$$\left\|\vec{R}\right\| = 141.42\ \mathbf{cm}$$

$$\theta = 180^\circ + \arctan\left(\frac{-20}{-140}\right)$$

$$\theta = 188.13^\circ \quad \text{Searah jarum jam}$$

SUMBER:
Halliday, D., Resnick, R., & Walker, J. (2013). *Fundamentals of physics*. John Wiley & Sons.