

Resolving Vectors by Components

Vectors by components

- In the $X - Y$ coordinate plane you may describe a vector in terms of (x, y) .
- Place the “start” or the tail of the vector on the origin $(0, 0)$.
- The “finish” or the head of the vector will extend out into the $X - Y$ coordinate plane with coordinates (x, y) .

Resolution of Vectors by components

1. For each vector being resolved determine the (x, y) for the head of the vector.
2. To find the X of the Resultant add the Xs of the vectors; to find the Y of the Resultant add the Ys of the vectors.
3. The resultant will start at the origin $(0, 0)$ and will end at $(x_1 + x_2, y_1 + y_2)$
4. Use the Pythagorean Theorem to determine the size of the resultant.
5. Use $\text{Arctan}(y/x)$ to determine the angle.

Example

- Given $V(A)$ as $(1, 0)$
- Given $V(B)$ as $(0, 1)$
- $V(A + B) = (1 + 0, 0 + 1) = (1, 1)$
- Size: $1^2 + 1^2 = c^2$ $c = \text{sq root of } 2$
- Angle: $\arctan 1/1 = 45$ degrees

Example

- Given $V(A)$ as $(2, 3)$
- Given $V(B)$ as $(1, 5)$
- $V(A + B) = (2 + 1, 3 + 5) = (3, 8)$
- Size: $3^2 + 8^2 = c^2$ $c = \text{sq root of } 73 = 8.5$
- Angle: $\arctan(8/3) = 69.4$ degrees

Group Activity

- Given Vectors $V(A)$ and $V(B)$ as components. Determine the resultant $V(A + B)$, its size, and its angle.
- 1. $V(A) = (10, 5)$; $V(B) = (5, 10)$
- 2. $V(A) = (-3, 5)$; $V(B) = (5, 3)$
- 3. $V(A) = (0, -5)$; $V(B) = (-5, -10)$
- 4. $V(A) = (7, -3)$; $V(B) = (2, -5)$