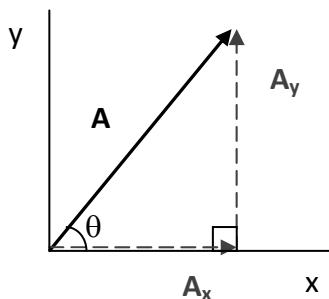


VECTORS 4

RESOLVING VECTORS INTO COMPONENTS

- ✓ Any vector can be resolved into **components** by using the **sine** and **cosine** functions
- ✓ The **x-component** is parallel to the x-axis; the **y-component** is parallel to the y-axis
- ✓ Components of a vector are scalars, but they are **signed numbers** because of the direction
- ✓ We **resolve** a vector of motion into its components to analyze the motion in two directions



$$A^2 = A_x^2 + A_y^2$$

$$\cos\theta = \frac{\text{adj.}}{\text{hyp.}} = \frac{A_x}{A}$$

$$\sin\theta = \frac{\text{opp.}}{\text{hyp.}} = \frac{A_y}{A}$$

$$A = \sqrt{A_x^2 + A_y^2}$$

$$A_x = A\cos\theta$$

$$A_y = A\sin\theta$$

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1. Find the components of the velocity of a helicopter traveling 95 km/h at an angle of 35° to the ground.
2. How fast must a truck travel to stay beneath an airplane that is moving 105 km/h at an angle of 25° to the ground?
3. An airplane is moving 250 km/h at angle of 35° to the ground? What is the vertical component of the airplane?
4. A truck drives up a hill with a 15° incline. If the truck has a constant speed of 22 m/s, what are the horizontal and vertical components of the truck's velocity?
5. What are the horizontal and vertical components of a cat's displacement when the cat has climbed 5 m directly up a tree?
6. A submarine dives 110.0 m at an angle of 10.0° below the horizontal. What are the two components of displacement?
7. A person walks 25.0° north of east for 3.10 km. How far would another person walk due north and due east to arrive at the same location?