"HEAD TO TAIL"

*Vectors*

Use the parallelogram rule to carefully construct the resultants for the eight pairs of vectors.
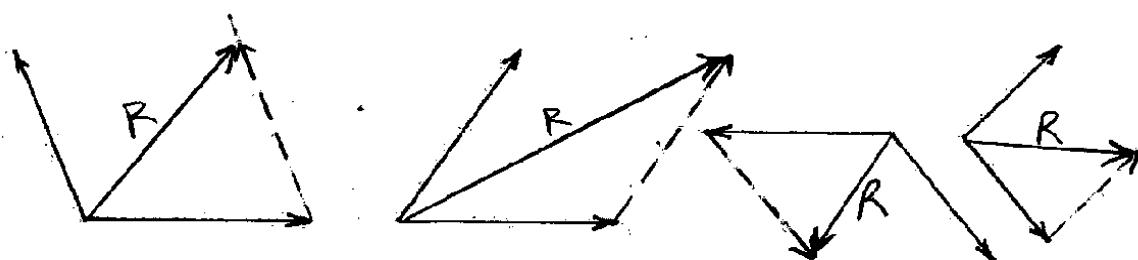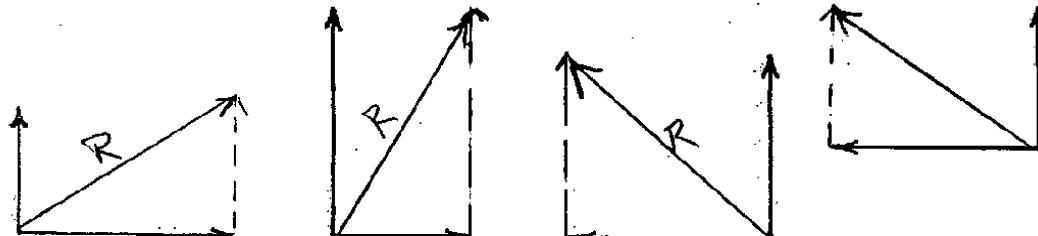
Carefully construct the vertical and horizontal components of the eight vectors.
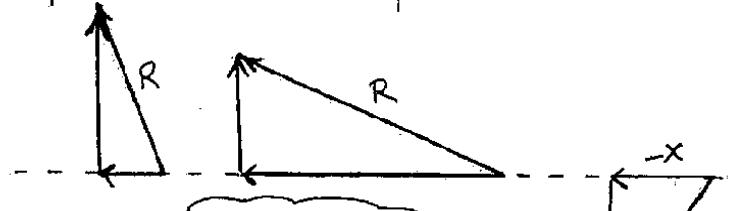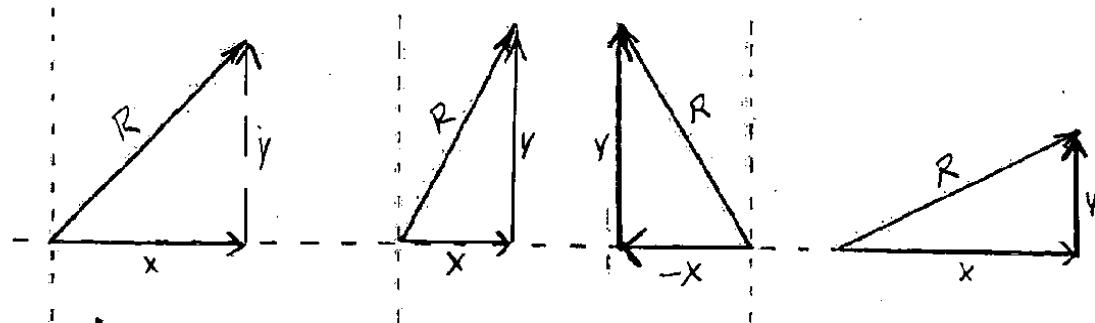
I was only a scalar until you came along and gave me direction! *sigh*

Conceptual PHYSICS

Tossed Ball

A ball tossed upward has initial velocity components 30 m/s vertical, and 5 m/s horizontal. The position of the ball is shown at 1-second intervals. Air resistance is negligible, and $g = 10$ m/s². Fill in the boxes, writing in the values of velocity *components* ascending, and your calculated *resultant velocities* descending.

10 m/s

5 m/s

5 m/s

5 m/s

−10 m/s

20 m/s

$$V = \sqrt{(5 \text{ m/s})^2 + (-10 \text{ m/s})^2}$$

11.2 m/s

Use the geometry theorem
$$c^2 = a^2 + b^2$$
to find the resultant velocities.

5 m/s

5 m/s

−20 m/s

30 m/s

20.6 m/s

$$V = \sqrt{(5 \text{ m/s})^2 + (-20 \text{ m/s})^2}$$

More specifically,
$$V = \sqrt{V_x^2 + V_y^2}$$

5 m/s

5 m/s

−30 m/s

30.4 m/s

$$V = \sqrt{(5 \text{ m/s})^2 + (-30 \text{ m/s})^2}$$

Conceptual **PHYSICS**