Prob-Chap02-PHYS-109

2.1. (a) What is the sum of the two vectors $\vec{a}$ = (5.00, 5.00) and $\vec{b}$ = (–14.00, 5.00)? (b) What is the magnitude and direction of $\vec{a} + \vec{b}$?

2.2. If vector $\vec{a}$ is added to vector $\vec{b}$, the result is the vector $\vec{c}$ = (6.00, 2.00). If $\vec{b}$ is subtracted from $\vec{a}$, the result is the vector $\vec{d}$= (–5.00, 8.00). (a) What is the magnitude of vector $\vec{a}$? (b) What is the magnitude of vector $\vec{b}$?

2.5. A competitive sprinter needs 9.90 seconds to run 100 metres. What is the average velocity in units metres per second (m/s) and in units kilometres per hour (km/h)?

2.9. A bacterium moves with a speed of 3.5 mm/s across a petri dish with radius r = 8.4 cm. How long does it take for the bacterium to traverse the petri dish along its diameter?

2.23. A ball is thrown at an angle of 60° to the horizontal with an initial speed of 10.0 m/s, as illustrated in Fig. 2.45. With its initial position taken to be the origin, find the position vector that describes the position of the ball 3.0 s later.

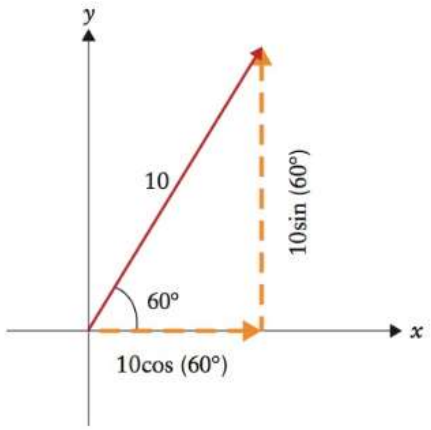

Figure 2.45 The initial velocity of the ball is broken into x- and y-components.