

PHYS 109: Suggested problems

CHAPTER 2

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.

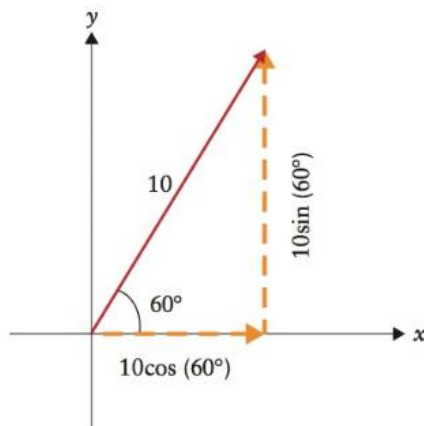


Figure 2.45 The initial velocity of the ball is broken into x - and y -components.