0.1 Homework

5. A train at a constant 60.0 km/h moves east for 40.0 min, then in a direction 50.0° east of due north for 20.0 min, and then west for 50.0 min. What are the (a) magnitude and (b) angle of its average velocity during this trip?

$$= 40\hat{i} + 20cos(40)\hat{i} + 20sin(40)\hat{j} - 50\hat{i}$$

$$= 5.32089\hat{i} + 12.8558\hat{j}$$

21. A dart is thrown horizontally with an initial speed of 10 m/s toward point P, the bull's-eye on a dart board. It hits at point Q on the rim, vertically below P, 0.19 s later. (a) What is the distance PQ? (b) How far away from the dart board is the dart released?

a) Solving for $\hat{i}$ component we get $10 \cdot 0.19 = 1.9m$, then solving for $\hat{j}$ we get

$$\Delta x = \frac{1}{2}at^2 = \frac{1}{2}(-9.8)(0.19)^2 = -0.17689$$

Then, the distance $\vec{PQ}$ must be $\sqrt{0.17689^2 + 1.9^2} = 1.90822m$