

## 0.1 Homework

5. A train at a constant 60.0 km/h moves east for 40.0 min, then in a direction  $50.0^\circ$  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?

$$\begin{aligned} &= 40\hat{i} + 20\cos(40)\hat{i} + 20\sin(40)\hat{j} - 50\hat{i} \\ &= 5.32089\hat{i} + 12.8558\hat{j} \end{aligned}$$

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

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

So the distance  $\vec{PQ} = |-0.17689| = 0.17689$

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

23.