

2D KINEMATICS – PRACTICE

1. A jogger runs at 8.5 km/h for 30.0 minutes due north. After 30.0 minutes he speeds up to 10.2 km/h and keeps the pace for 40.0 minutes while running 30° south of west. At the end the jogger walks briskly at 5.8 km/h for 12 minutes towards a coffee shop due east 22° north.
 - Find the Jogger's final displacement (in vector notation, its magnitude and direction).

2. A swimmer heads directly across a river swimming at 1.6 m/s relative to still water. She arrives at a point 40.0 m downstream from the point directly across the river, which is 80.0 m wide.

Determine:

- Speed of the current
- The magnitude of the swimmer's resultant velocity
- The direction of the swimmer's resultant velocity
- The time it takes the swimmer to cross the river

3. A car enters an intersection at 20.0 m/s where it collides with a truck. Nobody gets hurt. However, the impact rotates the car by 90° and gives it a speed of 15 m/s. Determine the average acceleration of the car if it was in contact with the truck for 1.25 s.