

## 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  $30^\circ$  south of west. At the end the jogger walks briskly at 5.8 km/h for 12 minutes towards a coffee shop due east  $22^\circ$  north.
  - Find the jogger's final displacement (in vector notation, its magnitude and direction).

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