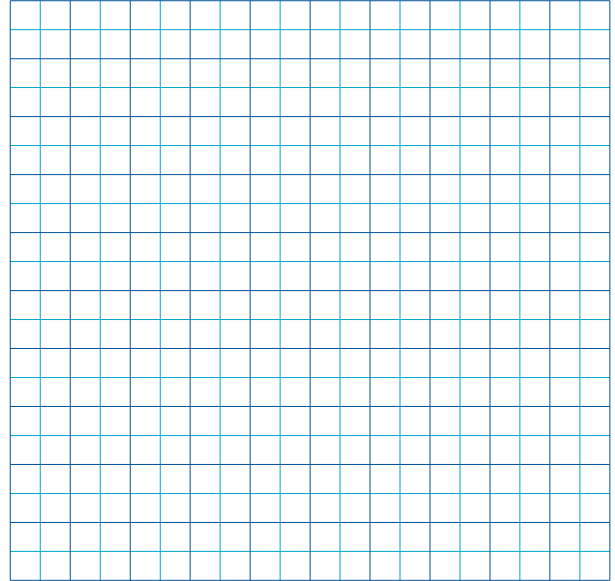


1. A bumblebee flew from its hive at (0,0) to a blue flower at (5,2) which didn't have any pollen, then to a yellow flower at (12,7) which also did not have pollen, only to eventually find the most amazing collection of pollen in a red flower at (18, 22). The bee wants to bring more bees to the red flower, how far and in what direction should they fly to go directly to the red flower. All measurements are in meters. (4 marks)



2. Using the component method shown in class, determine the NET displacement (magnitude and direction) for the following: $d_1=8\text{km N}60^\circ\text{W}$, $d_2=12\text{km due East}$, $d_3=6\text{km N}30^\circ\text{E}$. An accurate diagram is helpful and required. (8 marks)

3. An ecologist is trying to test for the average speed of a river that runs north to south, but he only has a boat and a stopwatch. He knows that the motor can push the boat with a speed of 6.5 m/s and that the width of the river is 45.5 m. While sitting in the boat on the eastern bank he points the motor due west and sets out. After crossing the river, while on the western bank he must walk 28 m to get back to the spot where he was aiming. What is the velocity of the river current? (4 marks)
4. A video game programmer is designing a soccer game and running tests to ensure that the game is as accurate as possible. As a test, a ball is kicked with an initial velocity of 18 m/s at an angle of 32° above horizontal. Include diagrams to explain where your numbers come from. (6 marks)
- (a) Calculate the soccer ball's maximum height.
 - (b) Calculate the soccer ball's time of flight.
 - (c) Calculate the soccer ball's range.