

2016 HONORS PRECALCULUS CHAPTER 6 FREE-RESPONSE QUESTION

SECTION 1, PART I and II

A graphing calculator is allowed for these problems.

Part I: An airplane is flying directly north at 300 miles/hour. There is a very strong crosswind of 45 miles per hour blowing directly from the west.

- Draw a vector diagram that models this situation.
- If no correction is made for the wind, what is the final bearing of the plane?
- If no correction is made for the wind, what is the final ground speed of the plane?
- What will the plane's coordinates be after 60 minutes? 30 minutes?

Part II: Another small plane traveling at 200 miles/hour leaves the origin at the same time as the plane in Part I. It points directly south, and is also subject to the 45 mile/hour crosswind that is blowing directly from the west.

- Draw a vector diagram representing the movements of **both planes**.
- What is the distance between the planes after 30 minutes have passed?
- After 30 minutes have passed, the control tower at $(0, 0)$ measures the angle between the two planes in degrees. What is the angle they measure?