

ERTH 465  
Inclass Exercise 3: Streamline Curvature  
Due Tuesday 17 September

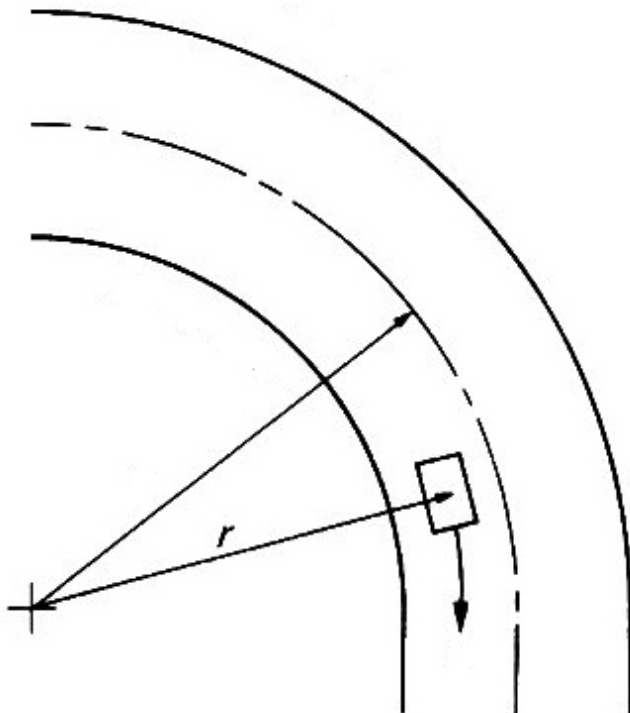
Please answer on back or on separate sheets, in complete sentences where appropriate.

You are provided with a 500 mb chart on which various locations, A, B, C, D, and E are shown.

Recall that the formula for streamline curvature is

$$k = \frac{1}{r}$$

where  $r$  = local radius of curvature for that given streamline, as discussed in class. The dimension for  $k$  and  $r$  is distance.



1. Draw short (100 km or so) streamline segments at each of the locations.
2. For which of the locations indicated would the absolute value of the curvature be the greatest and why?

Since  $k$  is inversely proportional to  $r$ , the streamline with the greatest magnitude curvature would clearly be A.

3. For which of the locations indicated would the absolute value of the curvature be the least and why?

Since for a straight streamline,  $k$  approaches  $1/\infty$ , the streamline at location D would have the least curvature.

4. For which of the locations shown would the sign of the curvature be negative and why?

Since anticyclonic (clockwise) streamlines have negative curvature, the only location near a streamline with anticyclonic curvature is at E.

5. For which of the locations A, B, or C would the cyclonic curvature be the least and why?

Since  $r$  is the greatest at location C (for those three locations), the streamline at C would have the least cyclonic curvature of the three.

1200 UTC Tue 22 Aug 2017

