**GEOG 310 Exercise Four (F2022)**

**VORTICITY AND ATMOSPHERIC WAVES**

**15 points**

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student#:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Calculate the average zonal index between 40°N and 60°N in Figure 1 based on

 measurements along the three meridians indicated. (3 points)

2. Relative vorticity can consist of two components, shear and curvature. Briefly

 describe how each of these is produced. (1 ½ points)

 a. On Figure 2 identify an area of positive and negative shear vorticity. (3/4 point)

 b. On Figure 3 identify an area of positive and negative curvature vorticity. (3/4 point)

3. On Figure 4 circle and shade an area of PVA and an area of NVA. (3 points)

4. On the map provided, draw with two or three lines the MODAL 500 mb flow over

 North America in winter. Then, circle, shade, and label the parts of the country

 which would likely experience the most precipitation (RAIN) and the warmest

 temperatures (WARM). (3 points)

5. Draw two diagrams below, depicting the Northern Hemisphere as viewed from above

 the north pole. On one show the MODAL 500 mb wave pattern in winter and show the summer pattern on the other. Indicate the position of the Rocky

 Mountains in each. (3 points)



