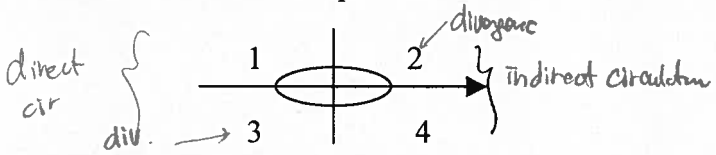
Sketch a low and associated cold, warm, and occluded fronts. Superimpose the typical cloud pattern, clearly showing the "dry slot". Then, superimpose numerous arrows over the whole region showing upward and downward motion. Finally, explain the cause for the dry slot in terms of vorticity advection and temperature advection.

✓ 5. Sketch streamlines AND isotachs for a situation of pure positive shearing deformation. Label the axes of contraction and dilatation.
Sketch isogons at 30 deg. Intervals for a case of pure positive vorticity that is centered at the point below. Label your isogons.

✓ 6. The diagram below is a jet streak at 300 mb. I have divided it into four regions that are labeled 1 – 4. Fill in the blanks below, noting that an answer may (or may not) consist of more than one quadrant.



The entrance region? 1, 3
Area containing rising motion? 2, 3
Area containg upper level divergence? 2, 3
What is the typical forward motion of jet streaks? 30 kts → |V| = 150 kt

✓ 7. Answer the following question using the enclosed wind plot. Use centered differences with $dS = dn$ = 2 deg lat ($2ds = 2dn$ =4 deg lat). Let 2 deg lat = 1 cm. Give your answers in 10^{-5} s^{-1}.
Calculate the divergence due to stretching at point A. Use natural coordinates, showing your axes on the diagram (in red), and ALL of your input data AND calculations below.
Calculate the divergence due to spreading at point A. Use natural coordinates, showing your axes on the diagram (in red), and ALL of your input data AND calculations below.

✓ 8. Answer the following questions based on inspection (no calculations).
Does shear lead to positive or negative vorticity at point B_____
Does curvature lead to positive or negative vorticity at point B_____
Do we expect the gradient wind to be stronger or weaker than the geostrophic widn at point B_____
Does stretching lead to convergence or divergence at point D_____
Should the actual contour spacing at point E be tighter or looser than the plotted wind suggest? _____

✓ 9. Use the box (inflow/outflow) procedure to estimate horizontal divergence at point C. Use the winds at Buffalo, NY and Chatham, MA in the calculations. Show your box on the diagram (in red) and all of your input data and calculations below. Express your answer in 10^{-5} s^{-1}.