a. The backbone dihedral angle preceding a proline can isomerize between the *cis* and *trans* configurations. Kinetics and equilibrium data obtained as a function of temperature are summarized below. Draw the free energy (Hill) diagram for proline isomerization at 30°C. Indicate the relative free energies of the *cis* and *trans* and transition state species. Please include the assumptions, equations and calculations you did to determine these values.



b. The enzyme prolyl isomerase catalyzes this reaction inside cells. On the Hill diagram, depict the changes in relative free energies of the *cis* and *trans* and transition state species. Justify your answer.