Binary Phase Diagrams - Solid Solution Behavior

1. On the first diagram, outline the liquidus in green, the solidus in brown.

2. Trace the behavior of the melt at A as it cools from 1800°C to 1400°C. Show the path followed by the liquid in red, and by the solid in blue on the first attached diagram.
   At what temperature do the first crystals appear? 1650°C
   What is the composition of the first crystals? Fo_{86}
   At what temperature is the liquid entirely converted to the solid? 1390°C
   What is the composition of the final liquid phase? Fo_{16}
   What is the composition of the liquid phase at 1500°C? Fo_{29}
   What is the composition of the solid at 1500°C? Fo_{65}

3. On the second diagram trace the behavior of composition B as it is heated from 1200°C to 1800°C. Again, show the path followed by the solid in blue and the path followed by the liquid in red.
   At what temperature does the first liquid appear? 1310°C
   What is the composition of the liquid at this temperature? Fo_{07}
   What is the composition of the solid at this temperature? Fo_{26}
   At what temperature does the last solid disappear? 1480°C
   What is the composition of the last solid? Fo_{63}
   What is the liquid composition at 1400°C? Fo_{18}
   What is the liquid composition at 1450°C? Fo_{23}
   What is the solid composition at 1450°C? Fo_{58}

Grading - 1 point for each colored line
   1 point per blank ± 20°C and ± 4% composition
   ± 40°C and ± 8% composition, -½ point

Total - 20 points
OLIVINE SOLID SOLUTION

TEMPERATURE, DEGREES CELSIUS

WEIGHT % FORSTERITE

Figure 1
OLIVINE SOLID SOLUTION

MELT

Figure 2