11. The figure below shows a river basin with mean annual precipitation depths (in inches) for several stations.

   a. Compute the mean annual precipitation for the entire basin with the arithmetic average method, the Thiessen polygon method, the isohyetal method, and one of the other methods we listed in class.

   b. Explain which of the three estimates you would recommend.
12. Consider the probable maximum precipitation (PMP) for Ames.
   a. Compute the PMP for a one-hour storm using the approximate formula for world-
      record precipitation amounts.
   b. Estimate the return period to which it corresponds for Ames.
   c. Describe engineering situations (if any) in which you would need to use the PMP
      for Ames.

13. (Adapted from an exam) The Snorton equation, which is proposed to estimate proba-
    ble maximum snowfall (PMSF) in Iowa, is \( S = 0.12t^{0.77} \), where \( S \) is snowfall in inches
    and \( t \) is duration in hours.
    a. Compute the PMSF for durations of 1, 8, and 24 hours.
    b. Discuss the results from part a and the merits of the Snorton equation.

14. (From an exam) The plot below shows three curves for interception as a function of
    precipitation depth. Which is the best curve and why?

![Graph showing three curves for interception as a function of precipitation depth]

15. Suppose an apple orchard in Hammonton, NJ will be cleared to build an industrial
    park. Compute the increase in runoff due to the change in interception for pre- and
    post-development conditions for a 2-hour storm with a return period of 25 years.
    Compare the results from the Horton formula and the more sophisticated formula
    we discussed. Assume a leaf area index of 10, a storage capacity of 10 mm, and an
    evaporation rate of 0.1 mm/hr.