1) Explain
measures of location and measures of variability with example.

2) The
probability that an American industry will locate in Shanghai, China, is 0.7, the probability that it will locate in Beijing, China, is 0.4, and the probability that it will locate in either Shanghai or Beijing or both is 0.8. What is the probability that the industry will locate

(a)
in both cities?

(b)
in neither city?

3) For
married couples living in a certain suburb, the probability that the husband will vote on a bond referendum is 0.21, the probability that the wife will vote on the referendum is 0.28, and the probability that both the husband and the wife will vote is 0.15. What is the probability that

(a)
at least one member of a married couple will vote?

(b)
a wife will vote, given that her husband will vote?

(c)
a husband will vote, given that his wife will not vote?

4) State
and prove **Bayes' rule.** Explain the significance of Bayes' rule in machine learning and AI.

5) A
box contains 500 envelopes, of which 75 contain $100 in cash, 150 contain $25, and 275 contain $10. An envelope may be purchased for $25. What is the sample space for the different amounts of money? Assign
probabilities to the sample points and then find the probability that the first envelope purchased contains less than $100.

6) The
probability that a married man watches a certain television show is 0.4, and

the probability that a married woman watches the show is 0.5. The probability that a man watches the show, given that his wife does, is 0.7. Find the probability that

(a)
a married couple watches the show;

(b)
a wife watches the show, given that her husband does;

(c)
at least one member of a married couple will watch the show.