1. A chemist measures the melting point, in degrees Fahrenheit, of a compound in an experiment with \( n = 6 \) replications. The temperatures are given by
\[ x_1 = 200, \ x_2 = 180, \ x_3 = 201, \ x_4 = 191, \ x_5 = 221, \ x_6 = 202. \]

(a) Calculate the mean \( \bar{x} \) and standard deviation \( s_x \) of the measurements.
(b) Suppose the temperatures are converted to the Celsius scale:
\[ y_j = \frac{5}{9}(x_j - 32) = -17.8 + 0.56x_j, \quad j = 1, \ldots, 6 \]
Obtain the mean, \( \bar{y} \), and standard deviation, \( s_y \), on the Celsius scale.

2. The chemist repeats the experiment many times for two different compounds resulting in the histograms of melting points shown below.

Which compound has a higher mean melting point? __________________________
Which compound exhibits more variability in melting point? __________________

3. Answer a) - d) true or false:

(a) If two events \( A \) and \( B \) each with nonzero probability are statistically independent, then it must be true that \( \Pr(A|B) = \Pr(A) \) and that \( \Pr(B|A) = \Pr(B) \).
(b) If two events \( A \) and \( B \) are mutually exclusive and have nonzero probability, then they can be independent.
(c) It is known that 10% of a certain population is age 70 or older and 51% of the population is female. It follows that 5.1% of the population is both female and age 70 or older.
(d) A farmer sends poultry through a washer device. Suppose that the device has a 60% probability of sufficiently washing the chicken to rid it of bacteria. Suppose two chickens are run through the device independently. This implies that the probability that both are sufficiently washed is 0.36 and that the probability that at least one is not sufficiently washed is 0.64.