12.23. (a) There are 150 independent observations, each with probability of “success” (response) \( p = 0.5 \). (b) \( \mu = np = (150)(0.5) = 75 \) responses. (c) The standard deviation is \( \sigma \approx 6.1237 \) responses, so \( P(X \leq 70) = P(Z \leq \frac{70-75}{6.1237}) = P(Z \leq -0.82) = 0.2061 \) (software gives 0.2313). (d) Use \( n = 200 \) because \( (200)(0.5) = 100 \).

12.28. We have \( \mu = 5000 \) and \( \sigma = 50 \) heads, so using the Normal approximation, we compute \( P(X \geq 5067) \approx P(Z \geq 1.34) = 0.0901 \) (or 0.918 with the continuity correction). If Kerrich’s coin were “fair,” we would see 5067 or more heads in about 9% of all repetitions of the experiment of flipping the coin 10,000 times, or about once every 11 attempts. This is some evidence against the coin being fair, but it is not by any means overwhelming.