

Recitation 13 Answers

1. (a) $\text{var}(L) = \text{var}(H) = \frac{15}{2}$. Given 40 bananas, we have $H = 40 - L$ which implies their variances will be equal.
- (b) i. $\mathbf{E}[W] = 200$, $\text{var}(W) = \frac{160}{3}$
ii. Let A = additional information, then $\mathbf{E}[W|A] = 190$, $\text{var}(W|A) = 20$.
iii. The additional information reduces our uncertainty about the total weight, so we get a lower variance. We also get a lower expectation because, based on the original distribution, 15 light bananas are more light bananas than we would expect out of 40 samples.
- (c) $k \geq 2134$ (Approximation using CLT)
2. (a) $\mathbf{E}[Y_n] = \mathbf{E}[Z_n] = 0$, $\text{var}(Y_n) = 16n^2$, $\text{var}(Z_n) = 16n$
(b) $\frac{1}{4}$ (exactly)
(c) 0.484 (Using CLT with Half-step approximation)
3. **Practice Problem:**
 - (a) $w \leq 190$
 - (b) $n \geq 421$