

2. **Problem 10 in the textbook (page 290)**

A factory produces X_n gadgets on day n , where the X_n are independent and identically distributed random variables, with mean 5 and variance 9.

- (a) Find an approximation to the probability that the total number of gadgets produced in 100 days is less than 440.
- (b) Find (approximately) the largest value of n such that

$$\mathbf{P}(X_1 + \cdots + X_n \geq 200 + 5n) \leq 0.05.$$

- (c) Let N be the first day on which the total number of gadgets produced exceeds 1000. Calculate an approximation to the probability that $N \geq 220$.