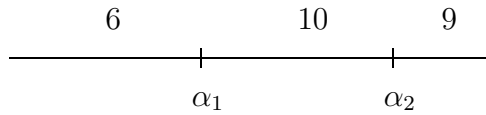


Question

Suppose that F is a continuous cdf on the real line; and let α_1 and α_2 be numbers such that $F(\alpha_1) = 0.3$ and $F(\alpha_2) = 0.8$. If 25 observations are selected at random from the distribution for which the cdf is F , what is the probability that 6 of the observed values will be less than α_1 , 10 of the observed values will be between α_1 and α_2 , and 9 of the observed values will be greater than α_2 ?

Answer

$$F(\alpha_1) = 0.3, \quad F(\alpha_2) = 0.8$$

Group 1 $\leq \alpha_1$	$p_1 = 0.3$	$x_1 = 6$
Group 2 (α_1, α_2)	$p_2 = 0.8 - 0.3 = 0.5$	$x_2 = 10$
Group 3 (α_2, ∞)	$p_3 = 1 - 0.8 = 0.2$	$x_3 = 9$

Therefore required probability is:

$$\frac{n!}{x_1!x_2!x_3!} p_1^{x_1} p_2^{x_2} p_3^{x_3} = \frac{25!}{6!10!9!} (0.3)^6 (0.5)^{10} (0.2)^9$$