

Answer on Question #83695 – Math – Statistics and Probability

Question

Suppose that 55% of all babies born in a particular hospital are girls. If 7 babies born in the hospital are randomly selected, what is the probability that fewer than 2 of them are girls?

Carry your intermediate computations to at least four decimal places, and round your answer to at least two decimal places.

Solution

Let X be the number of girls. Then $X \sim B(n, p)$, where

$n = 7, p = 0.55$, hence

$$\begin{aligned} P(X = x) &= C_x^n p^x (1 - p)^{n-x} = \binom{n}{x} p^x (1 - p)^{n-x}; \\ P(X < 2) &= P(X = 0) + P(X = 1) = \\ &= \binom{7}{0} (0.55)^0 (1 - 0.55)^{7-0} + \binom{7}{1} (0.55)^1 (1 - 0.55)^{7-1} = \\ &= (0.45)^6 (0.45 + 7(0.55)) \approx 0.0041(4.3) \approx 0.0176 \approx 0.02. \end{aligned}$$

Answer: $P(X < 2) \approx 0.0176 \approx 0.02$.