Answer on Question #70948 – Math – Statistics and Probability

Question

A and B play 12 games of chess, of which 6 are won by A, 4 are won by B, and 2 end in a draw. They agree to play a match consisting of 3 games. Find the probability that
a) A wins all 3 games
b) 2 games end in a draw
c) A and B win alternately
d) B wins at least 1 game.

Solution

a) Binomial probability with $n = 3$, $p = \frac{6}{12} = \frac{1}{2}$.

$$P(X = 3) = C_3^3 \left(\frac{1}{2}\right)^3 = \frac{1}{8} = 0.125.$$

b) Binomial probability with $n = 3$, $p = \frac{2}{12} = \frac{1}{6}$.

$$P(X = 2) = C_3^2 \left(\frac{1}{6}\right)^2 \left(\frac{5}{6}\right) = \frac{5}{12} \approx 0.4167.$$

c) $P = \frac{1}{2} * \frac{1}{3} * \frac{1}{2} + \frac{1}{3} * \frac{1}{2} * \frac{1}{3} = \frac{1}{12} + \frac{1}{18} = \frac{5}{36} \approx 0.1389.$

d) Binomial probability with $n = 3$, $p = \frac{4}{12} = \frac{1}{3}$.

$$P(X \geq 1) = 1 - P(X = 0) = 1 - C_3^0 \left(\frac{1}{3}\right)^0 \left(\frac{2}{3}\right)^3 = 0.7037.$$

Answer: a) 0.125; **b)** 0.4167; **c)** 0.1389; **d)** 0.7037.