

3-7-(37)

Suppose a bucket contains 10 red, 10 white and 30 blue balls. Three are chosen randomly at the same time. Let R be the number of red balls chosen, W the number of white balls chosen, and B the number of blue balls chosen. Find $E(R+dW-B)$

37 A

$$E(R+dW-B) = E(R) + dE(W) - E(B)$$

$$E(R) = \sum_a aP(X=a)$$

$$E(R) = \sum_{1 \leq k \leq 30} R_k = \sum_{1 \leq k \leq 30} \begin{cases} 1 & \text{if } k^{\text{th}} \text{ ball is Red} \\ 0 & \text{if not} \end{cases}$$

$$R = R_1 + R_2 + \dots + R_{30}$$

$$E(R) = E(R_1) + E(R_2) + \dots + E(R_{30})$$

$$E(R_k) = \frac{10}{10+10+30} = \frac{10}{50} = \frac{1}{5}$$

$$E(R) = \frac{1}{5} + \frac{1}{5} + \dots + \frac{1}{5}_{30}$$

$$E(R) = \frac{30}{5} = \frac{15}{1} = 5$$

$$E(R) = 5$$

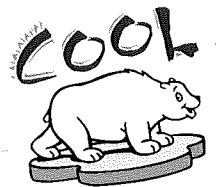
$$E(W) = E(W_1) + E(W_2) + \dots + E(W_{30})$$

$$E(W_k) = \frac{10}{50} = \frac{1}{5}$$

$$E(W) = \frac{1}{5} + \frac{1}{5} + \dots + \frac{1}{5}_{30}$$

$$E(W) = \frac{30}{5} = 6$$

$$E(W) = 6$$



$$E(B) = E(B_1) + E(B_2) + \dots + E(B_{30})$$

$$E(B_k) = \frac{30}{50} = \frac{3}{5}$$

$$E(B) = \frac{3}{5} + \frac{3}{5} + \dots + \frac{3}{5}_{30}$$

$$E(B) = \frac{30}{5} = 6$$

$$E(B) = 6$$

~~E(R+dW-B)~~

$$E(R+dW-B) = E(R) + dE(W) - E(B)$$

$$= 5 + (2)(6) - (6)$$

$$= 5 + 12 - 6$$

$$= 11$$

$$E(R+dW-B) = 10$$