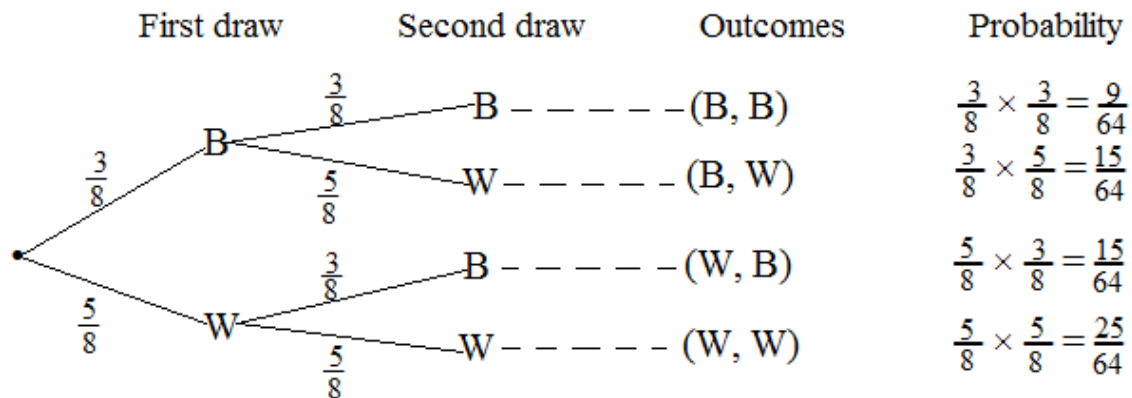


Answer on Question #70663, Math / Statistics and Probability

A bag contains 3 black balls and 5 white balls. Samuel picks a ball at random from the bag and replaces it back in the bag. He mixes the balls in the bag and then picks another ball at random from the bag. Construct a probability tree of the problem and calculate the probability that Samuel picks:

- i) Two black balls and
- ii) A black ball in his second draw.

Solution



Check that probabilities add up to 1

$$\frac{9}{64} + \frac{15}{64} + \frac{15}{64} + \frac{25}{64} = \frac{9 + 15 + 15 + 25}{64} = \frac{64}{64} = 1$$

- i) Two black balls

First locate the B branch and then follow the second B branch

Outcomes	Probability
(B, B)	$\frac{3}{8} \times \frac{3}{8} = \frac{9}{64}$

$$P(\text{two blacks}) = P(B, B) = \frac{9}{64}$$

- ii) A black ball in his second draw.

There are two outcomes where the second ball can be black.

Outcomes	Probability
(B, B)	$\frac{3}{8} \times \frac{3}{8} = \frac{9}{64}$
(W, B)	$\frac{5}{8} \times \frac{3}{8} = \frac{15}{64}$

$$P(\text{A black ball in second draw}) = P(B, B) + P(W, B) = \frac{9}{64} + \frac{15}{64} = \frac{24}{64} = \frac{3}{8}$$

Answer provided by <https://www.AssignmentExpert.com>