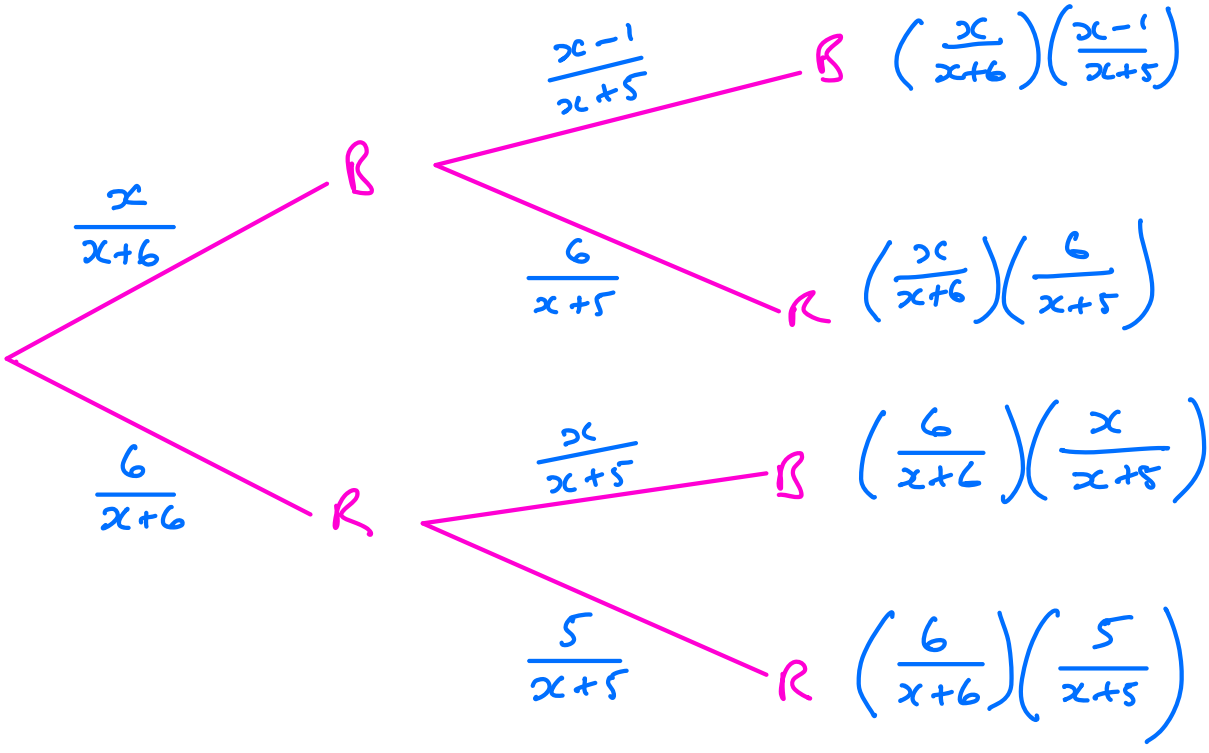
Probability Trees

In bag there are x blue counters and 6 red counters. Two counters are picked without replacement. Represent on a probability tree.

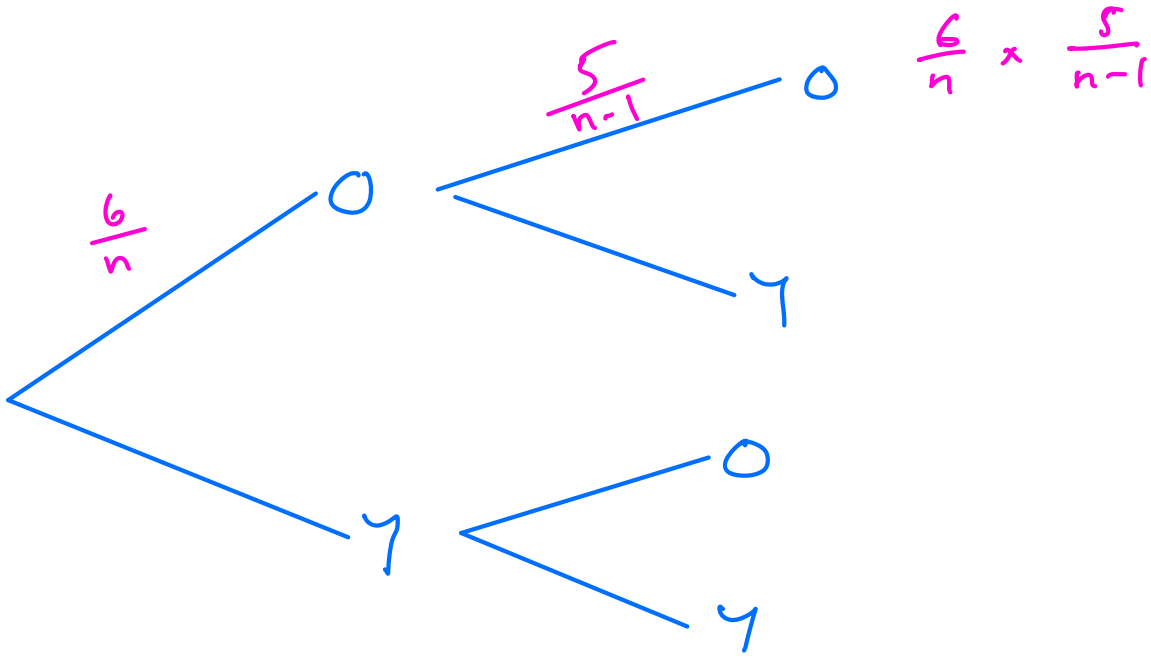


i) Find prob both same colour

$$= \left(\frac{x}{x+6}\right)\left(\frac{x-1}{x+5}\right) + \left(\frac{6}{x+6}\right)\left(\frac{5}{x+5}\right)$$

$$= \frac{x^2 - x + 30}{(x+6)(x+5)}$$

Bag has n sweets. 6 orange and the rest yellow. Hannah eats 2 orange sweets having picked them at random. The prob of this is $\frac{1}{3}$. Show $n^2 - n - 90 = 0$



Given $P(OO) = \frac{1}{3}$

$$\Rightarrow \quad \frac{6}{n} \times \frac{5}{(n-1)} = \frac{1}{3}$$

$$\frac{30}{n(n-1)} = \frac{1}{3}$$

$$90 = n(n-1)$$

$$0 = n^2 - n - 90$$

$$0 = (n-10)(n+9)$$

$$\Rightarrow \quad n-10=0 \quad \text{or} \quad n+9=0$$

$$n=10 \qquad n=-9$$

$n = 10$