

1 There are only blue pens and red pens in a box.

The number of blue pens is four times the number of red pens.

Rita takes at random one pen from the box.

She records the colour of the pen and then replaces it in the box.

Rita does this n times, where $n \geq 2$

Write down an expression, in terms of n , for the probability that Rita gets a blue pen at least once and a red pen at least once.

$$\text{Ratio} = \text{Blue} : \text{red}$$
$$4 : 1$$

$$P(\text{taking blue pen}) = \left(\frac{4}{5}\right)^n \quad (1)$$

$$P(\text{taking red pen}) = \left(\frac{1}{5}\right)^n$$

Probability of taking 1 red pen or 1 blue pen :

$$= 1 - \left(\frac{4}{5}\right)^n - \left(\frac{1}{5}\right)^n \quad (1)$$

$$\underline{\underline{1 - \left(\frac{4}{5}\right)^n - \left(\frac{1}{5}\right)^n}}$$

(Total for Question 1 is 2 marks)