Cambridge International AS & A Level

\_\_\_\_\_

**Mathematics** 

9709/52

Paper 5 Probability & Statistics 1

May/June 2024

Question No (1)

https://kingcambridgesolutions.com

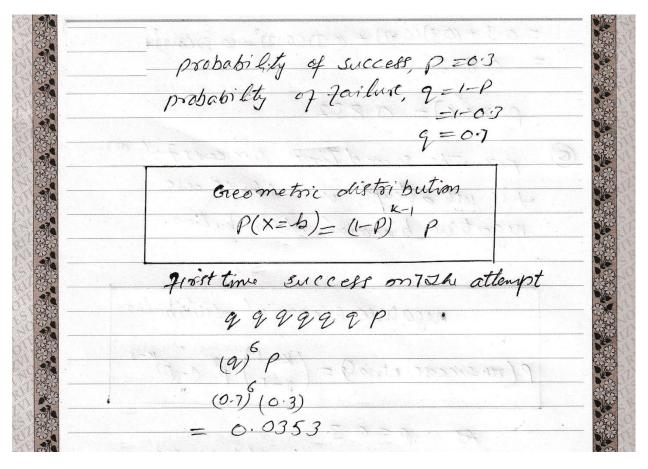
## Question No (1)

Rajesh applies once every year for a ticket to a music festival. The probability that he is successful in any particular year is 0.3, independently of other years.

- (a) Find the probability that Rajesh is successful for the first time on his 7th attempt.
- (b) Find the probability that Rajesh is successful for the first time before his 6th attempt.
- (c) Find the probability that Rajesh is successful for the second time on his 10th attempt.

## Solution:

(a)



(b)

$$P = 0.3$$

$$P = 0.3$$

$$P = 0.1$$

$$Ra = 0.1$$

$$Ra = 0.1$$

$$Ra = 0.1$$

$$P(x < 6)$$

$$P(x < 6)$$

$$P(x < 6) = P(x = 4) + P(x = 2) + P(x = 3) + P(x = 3) + P(x = 5)$$

$$P(x < 6) = P(x = 4) + P(x = 2) + P(x = 3) + P(x = 3) + P(x = 5)$$

$$P(x < 6) = 0.832$$

$$P(x < 6) = 0.832$$

por The second time successful on his with attempt, we shall use negative binomial distribution.

regative Binomial slightibution  $P(\text{rensuccess, ethial}) = {\binom{K-1}{\gamma-1}} p^{\gamma} (1-p)^{K-\gamma}$ 

As 
$$p = 0.3$$
  
 $x = 2$  (second success)  
 $k = 10$  Third 2  
 $P(x = 10) = \binom{10-1}{2-1} \binom{0.3}{0.3} \binom{1-0.3}{0.3}$   
 $= \binom{9}{1} \binom{0.3}{0.3} \binom{10.7}{0.3}$   
 $P(x=10) = 0.0467$