

# Answer Key Table

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Question:- If the letters of the word ASSASSINATION are arranged at random. Find the Probability that

- (a) Four  $S's$  come consecutively in the word
- (b) Two  $I's$  and two  $N's$  come together
- (c) All  $A's$  are not coming together
- (d) No two  $A's$  are coming together

**Solution:** Number of letters in word 'ASSASSINATION' = 13

Letter's are  $3A's, 4S's, 2I's, 2N's, 1T's$  and  $1O's$

$$\text{Total ways of arranging letters} = \frac{13!}{3!4!2!2!} \quad (1)$$

Random variable	values	Events
X	0	All $S's$ are together
	1	All $S's$ are not together
Y	0	$2I's$ and $2N's$ are together
	1	$2I's$ and $2N's$ are not together
Z	0	All $A's$ together
	1	Only $2A's$ are together
	2	No $2A's$ are together

(a)

$$p_X(0) = \frac{\frac{10!}{3!2!2!}}{\frac{13!}{3!4!2!2!}} \quad (2)$$

$$= \frac{2}{143} \quad (3)$$

(b)

$$p_Y(0) = \frac{\frac{10!4!}{3!4!2!2!}}{\frac{13!}{3!4!2!2!}} \quad (4)$$

$$= \frac{2}{143} \quad (5)$$

(c)

$$p_Z(0) = \frac{\frac{11!}{4!2!2!}}{\frac{13!}{3!4!2!2!}} \quad (6)$$

$$= \frac{1}{26} \quad (7)$$

Probability of all  $A$ 's not coming together:

$$p_Z(1) + p_Z(2) = 1 - p_Z(0) \quad (8)$$

$$= 1 - \frac{1}{26} \quad (9)$$

$$= \frac{25}{26} \quad (10)$$

(d)

$$p_Z(2) = \frac{\frac{11!10!}{3!8!4!2!2!}}{\frac{13!}{3!4!2!2!}} \quad (11)$$

$$= \frac{15}{26} \quad (12)$$