Q-10.13.3.10

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Question: 6 boys and 6 girls sit in a row at random. The probability that all the girls sit together is

1) $\frac{1}{432}$
2) $\frac{12}{431}$
3) $\frac{1}{132}$
4) none of the above

Solution: The number of ways in which n people can sit in a row

$$= n! \tag{1}$$

$\therefore$ for 6 boys and 6 girls, total number of arrangements

$$= 12! \tag{2}$$

Parameter	Value	Description
X	1-12	Represents the number of selected people sitting together

Finding pmf:

$$p_X(k) = Pr(X = k) \tag{3}$$
$$= \frac{(12 - k + 1)! \times k!}{12!} \tag{4}$$

$\therefore$ probability of 6 girls sitting together

$$= p_X(6) = Pr(X = 6) \tag{5}$$
$$= \frac{(12 - 6 + 1)! \times 6!}{12!} \tag{6}$$
$$= \frac{7! \times 6!}{12!} \tag{7}$$
$$= \frac{1}{132} \tag{8}$$

$\therefore$ option 3 is correct.