CS & IT



Discussion

Discrete Mathematics

Combinatorics

DPP 01





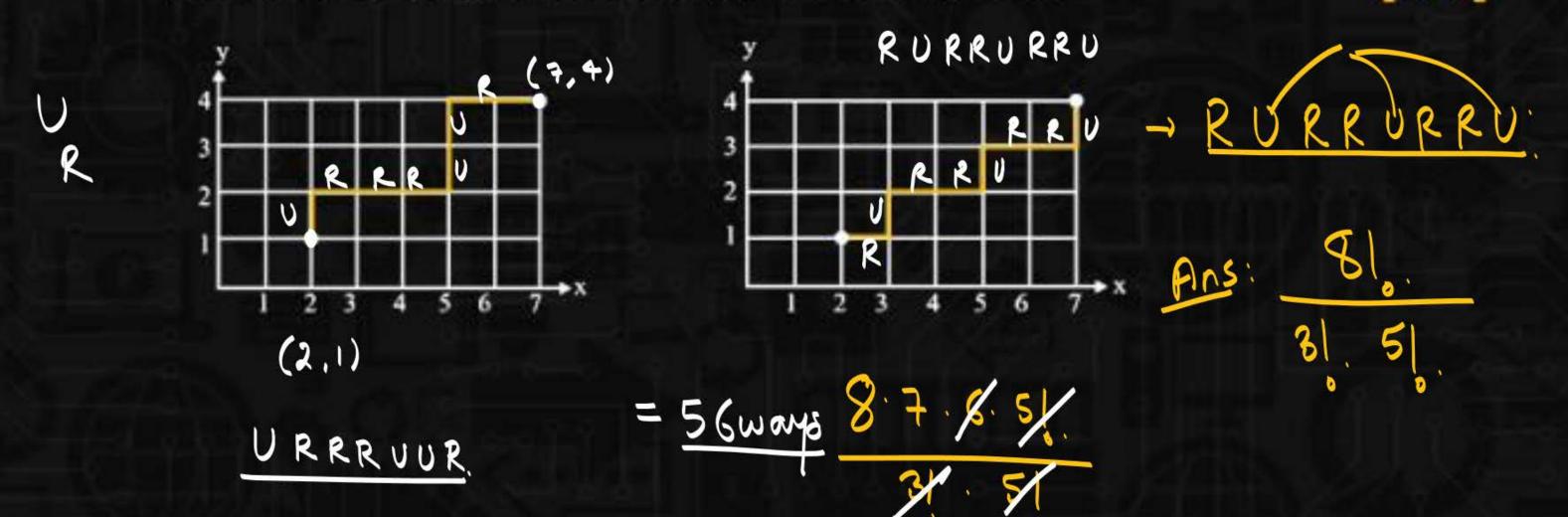
TOPICS TO BE COVERED

01 Question

02 Discussion



Determine the number of (staircase) paths in the xy – plane from (2, 1) to (7, 4), where each such path is made up of individual steps going one unit to the right (R) or one unit upward (U). The bold lines in Figure. show two of these paths.





How many nonnegative integer solutions are there to the pair of equations $x_1 + x_2 + x_3 + ... + x_7 = 37$, $x_1 + x_2 + x_3 = 6$? [MCQ]



A.
$$\binom{42}{12}\binom{34}{31}$$

8 $\binom{2}{3} \times 34\binom{3}{3}$

8 $\binom{2}{3} \times 34\binom{3}{3}$

8 $\binom{34}{31}$

8 $\binom{34}{31}$

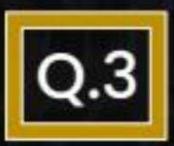
8 $\binom{34}{31}$

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9 $\binom{34}{31}$

8 $\binom{34}{31}$

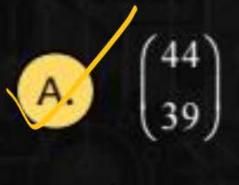
9 $\binom{$



Determine the number of integer solution of $x_1 + x_2 + x_3 + x_4 + x_5 < 40$, where $x_i \ge 0$, $1 \le i \le 5$.



[MCQ]



A.
$$\binom{44}{39}$$
 $\frac{21+2+2+4+4+5}{10} = \binom{39}{38}$ $\frac{39}{38}$ $\frac{39}{38}$ $\frac{39}{38}$ $\frac{1+2+2+2+2+4+2}{39} = \frac{39}{38}$

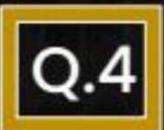
$$\begin{array}{c} G \\ \end{array} \begin{pmatrix} 41 \\ 11 \end{pmatrix}$$

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None of these

NIA UZING + NA + NS + N6 = 39



Determine the number of integer solution of



$$x_1 + x_2 + x_3 + x_4 + x_5 < 40$$
, where $x_i \ge -3$, $1 \le i \le 5$



How many ways are there to place 12 marbles of the same size in five distinct jars if the marbles are all black?

[NAT]



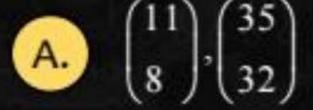
Determine the number of integer solutions of



$$x_1 + x_2 + x_3 + x_4 = 32$$
, where

(I)
$$x_1 \ge 0, 1 \le i \le 4$$

(II)
$$x_1 > 0, 1 \le i \le 4$$



$$\begin{array}{c} C. \\ 32 \end{array}, \begin{pmatrix} 35 \\ 8 \end{pmatrix}$$

$$\begin{array}{c}
(35) \\
(32), \\
(38)
\end{array}$$

None of these



A certain ice cream store has 31 flavors of ice cream available. In how many ways can we order a dozen ice cream cones if a flavor may be ordered as many as 12 times?

[MCQ]



$$\begin{array}{c} A. \\ 12 \end{array}$$

$$\binom{42}{11}$$

B.
$$\binom{31}{12}$$
 4 2

D. None of these



In how many ways can 10 (identical) dimes be distributed among five children if there are no restrictions?



$$\begin{array}{c} A. \\ 8 \end{array}$$

$$\begin{array}{c} C \\ \end{array} \begin{pmatrix} 23 \\ 11 \end{pmatrix}$$

Find the coefficient of x^{16} in the expansion of $\left(2x^2 - \frac{x}{2}\right)^{12}$.



$$(2n^{2}-\frac{31}{2})^{2}$$
 $(2n^{2})^{-\frac{3}{2}}$
 $(2n^{2})^{-\frac{3}{2}}$

$$12 \text{ ck}^{(2)}$$
 χ^{24-2k} $\left(-\frac{1}{2}\right)^{k}$ $(\chi)^{k}$

$$\frac{(-\frac{1}{2})^{2}}{(-\frac{1}{2})^{2}} \times \frac{(-\frac{1}{2})^{2}}{(-\frac{1}{2})^{2}} \times \frac{(-\frac{1}{2})^{2}}{(-\frac{1}{2})$$

[NAT]
$$|2_{C} \times (2) \times \pi$$

$$|2_{C$$



How many ways are there to place 12 pebbles of the same size in five distinct jars if each pebble is a different color? [MCQ]





C. 12





