What is the coeff of $x^2 y^2 z^2$ in $(x+y+z)^6$

~~$x y^3 z$~~

$(x_1 + x_2 + \dots + x_n)^n$ ✓ $\quad n^{th} \quad \frac{6!}{2!\,2!\,2!}$

5,5 $\binom{10}{5}$

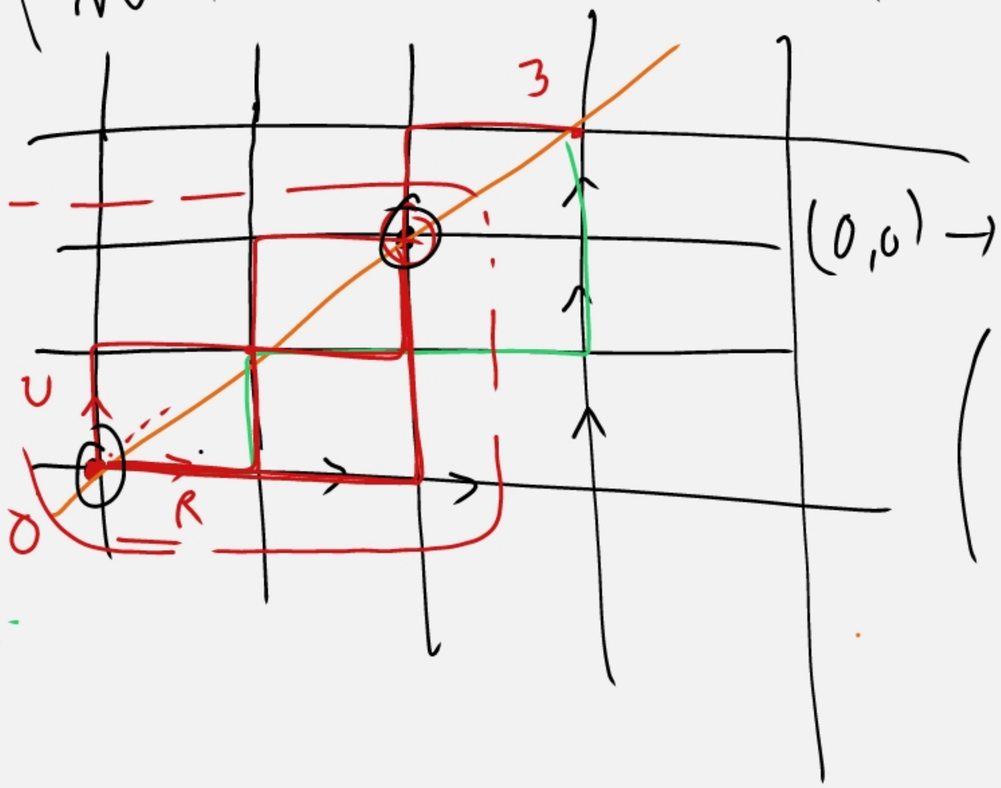
(n,n) $\binom{2n}{n}$ ✓

D

$\binom{6}{3} = 20$ ✓

UURR $\binom{4}{2} = 6$ ~~7~~

4.



$\binom{6}{3}$ — unwanted = ans.

$(0,0) \to (n,n)$

$\binom{2n}{n} - \binom{2n}{n+1}$

$n=0$ ×

$n=1 = 1$

$n=2 = 2$

$n=3 = 5$

$n=4 = 14$

⋮

R's U's

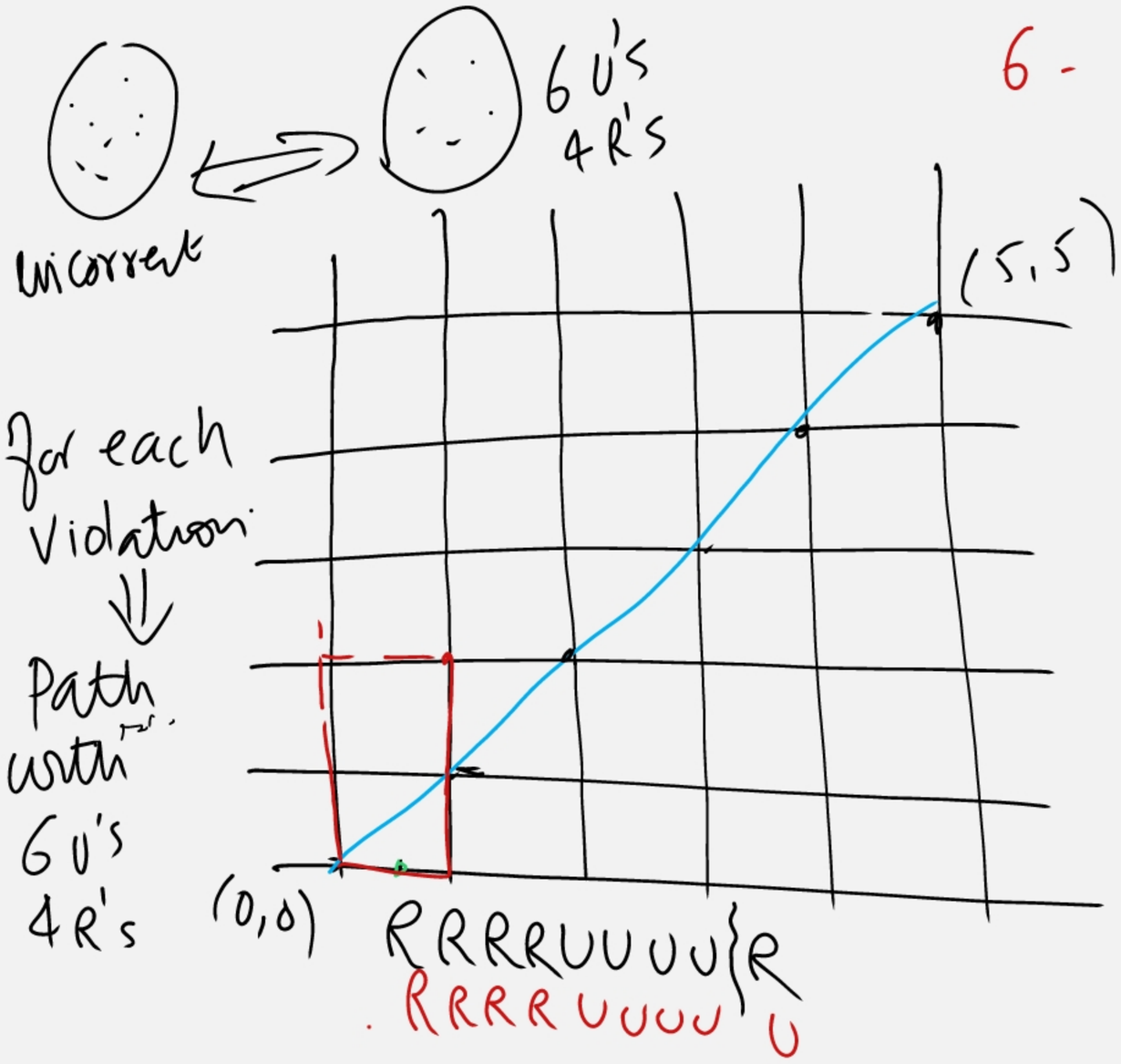
URURUR

RRRUUU

RRURUU

RURURU

6 -



RRRRRUUUUU $\binom{10}{5} - \binom{10}{6}$

RUU|RRUUURR

$N(R) < N(U)$

$\#R > \#U$

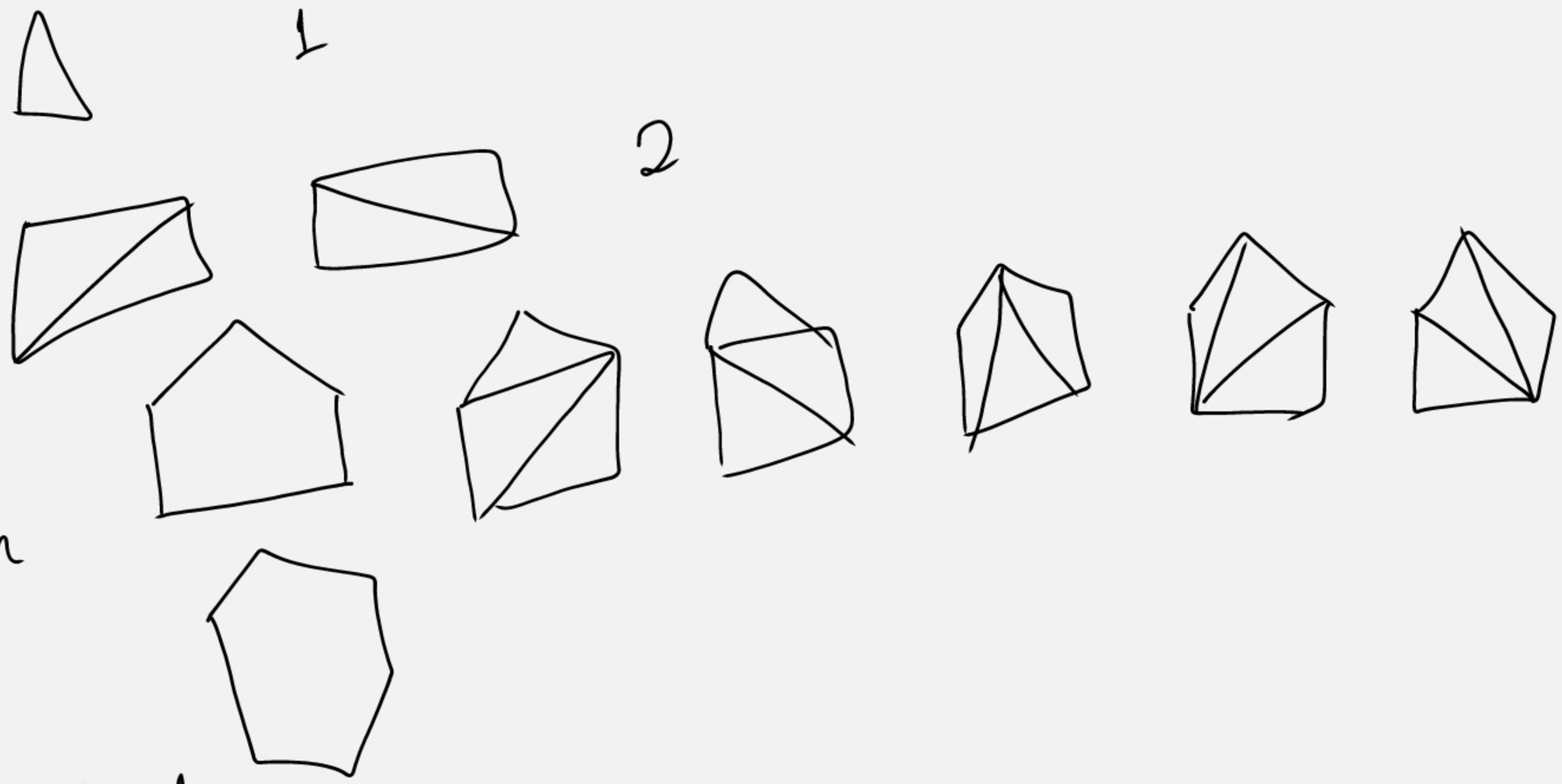
$n = 2$

compliment

RUU | UURRRUU [6 U's, 4 R's]

RRUUUU | RRRUU [6 U's, 4 R's]

RRUUUU | UUURR [6 U's, 4 R's]



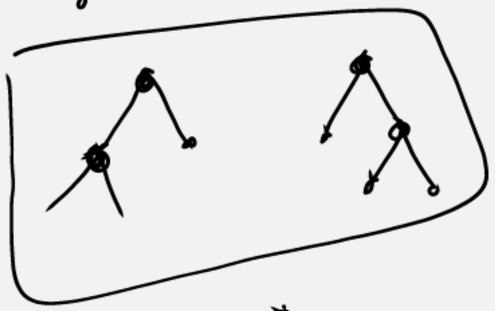
$nC_2 - n$

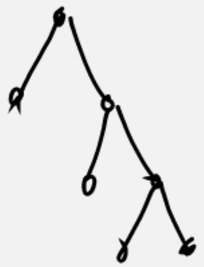
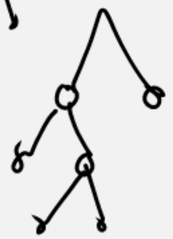
n-gon

No. of diagonals.

$n = 0$ - - 1

$n = 1$ - 1 root 2 branches

$n = 2$  → 2 roots 2 branches 2

$n = 3$   5

3 root having
5 branches

1

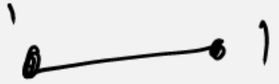
1

1

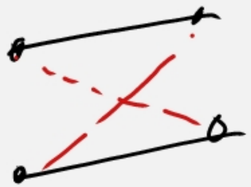
binary trees

n

$n=1$



$n=2$



$n=3$

(5)

1
1
2
5
14
⋮

CATALAN numbers