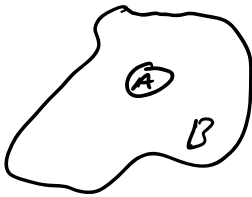


# СЕМ Упр

## Геометрични вероятности



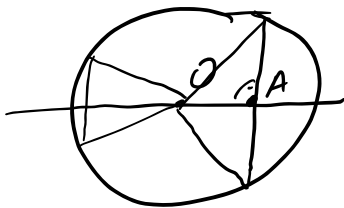
каква е шанса точка случайно поставена в големия да попадне в малкия

$$\frac{S_A}{S_B}$$

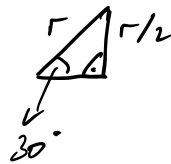
$$P(x \in A) = \frac{\mu(A)}{\mu(N)}$$

\*)  $\mu(A)$  -  $n$ -мерен обем  
дължина, площ, обем ...

④



равностранен триъгълник



$$OA = \frac{r\sqrt{3}}{2}$$

$$d = 2r$$

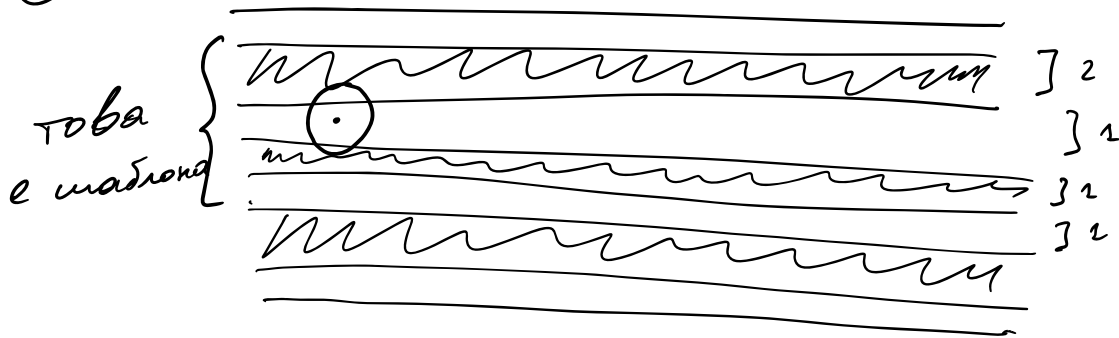
→ вероятността

$$= \left\lfloor \frac{2 - \sqrt{3}}{2} \right\rfloor$$

сумата от всички  
на 2те  
крайни  
отсечки

$$\frac{2r - r\sqrt{3}}{2r} = d$$

②



A - гъна

B - широка ивица

$$P(A) = \frac{3}{5}$$

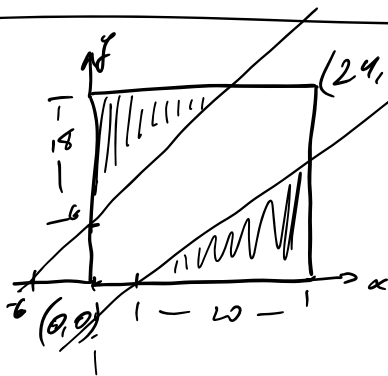
$$P(B) = \frac{4}{5}$$

$$P(A \cup B) = 1$$

$$P(A \cap B) = P(A) + P(B) - P(A \cup B) = \frac{2}{5} = P(A \cap B)$$

$$P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{2/5}{4/5} = 1/2$$

③



$(x, y) = (\text{голям парче})$

За  $x \leq y$  (първо пристига големия)

$$y \geq x + 6$$

За  $y < x$  (първо пристига малкия)

$$x \geq y + 4$$

$$\frac{18^2 + 20^2}{2} = 24^2$$

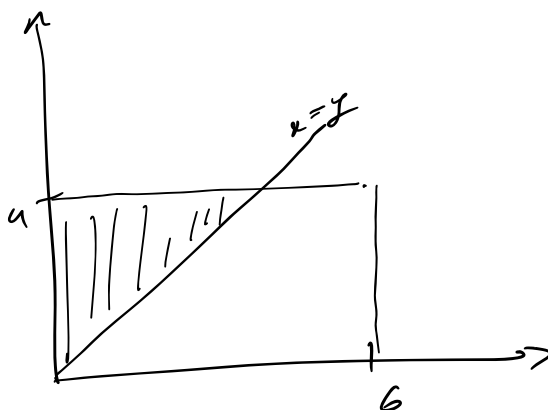
④ A - 6

B - 4

$x \sim A$

$y \sim B$

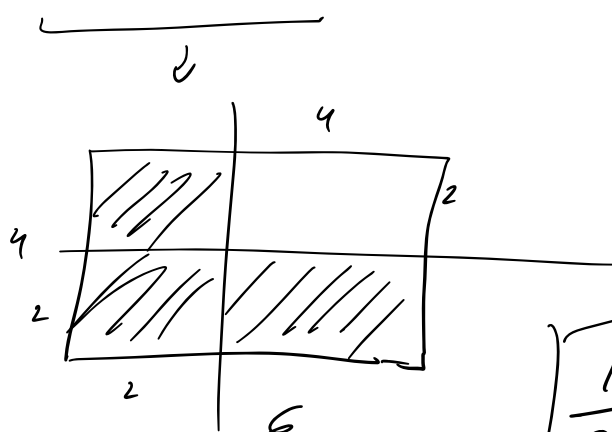
$x \leq y$



a/ Отт.  $\frac{\frac{4^2}{2}}{4 \cdot 6} = \boxed{\frac{1}{3}}$



b/  $P(x \leq 2 \vee y \leq 2) = 1 - P(x > 2 \wedge y > 2)$



$\boxed{\frac{16}{24}}$

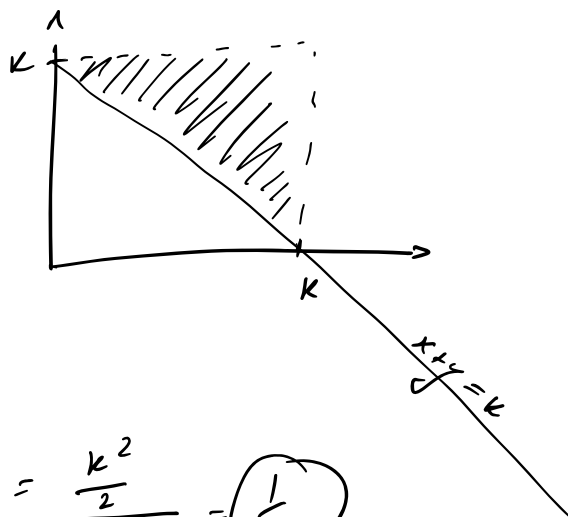
$= 1 - \underbrace{\frac{1}{2}}_{\substack{\text{первая} \\ \text{часть}}} \cdot \underbrace{\frac{2}{3}}_{\substack{\text{вторая} \\ \text{часть}}} = \boxed{\frac{2}{3}}$

5

$x, y, k$

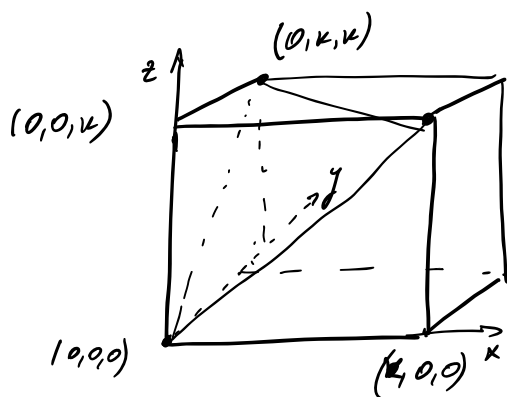
$x < k, y < k$

$x, y, k$  - три независимки  $\Leftrightarrow x+y > k$



$$P(\Delta) = \frac{\frac{k^2}{2}}{k^2} = \left(\frac{1}{2}\right)$$

6



$$(x, y, z) \in [0, k]^3$$

$$\begin{aligned} \text{Търсим } P(x+y > z \cap x+z > y \cap z+y > x) \\ = 1 - P(x+y < z \cup x+z < y \cup y+z < x) \end{aligned}$$

интуитивно, по формула то  
грешно  $\sum_{0 \leq s \leq k} P(\Delta | \max = s) \cdot P(\max = s)$   
 $\frac{1}{2} \cdot \frac{1}{k}$   
 $= \frac{1}{2}$

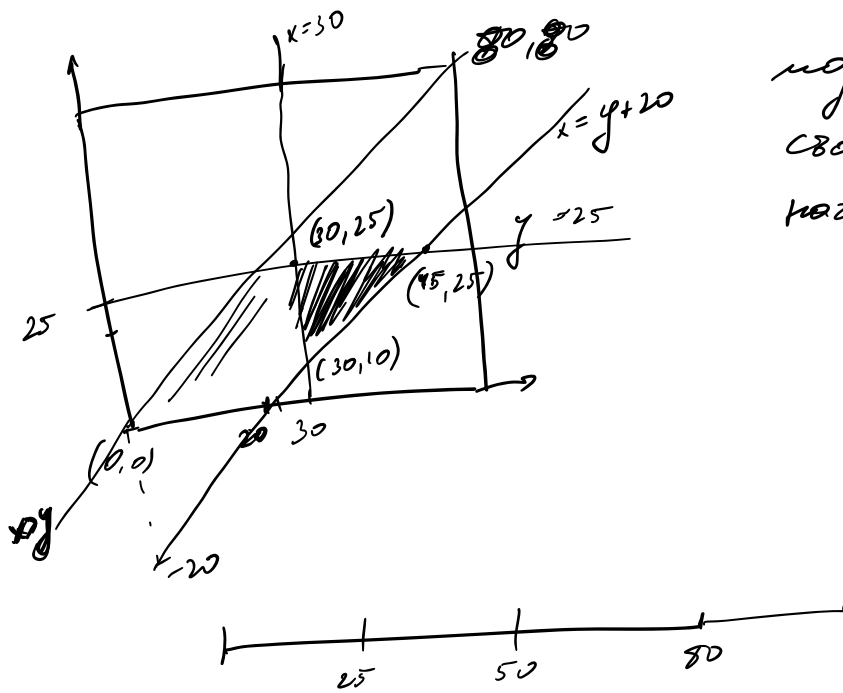
$$= 1 - \left[ P(x+y < z) + P(x+z < y) + P(z+y < x) \right] = \frac{3 \cdot \left( \frac{k \cdot \frac{k^2}{2}}{k^3} \right) / 3}{k^3} = \left( \frac{1}{2} \right)$$

$\rightarrow$  независими събития / обем на пирамида

$$\begin{aligned} P(x+y < z) : x+y < z \\ = \frac{\left( \frac{k \cdot \frac{k^2}{2}}{3} \right)}{k^3} \end{aligned}$$

$(0,0,0)$   
 $(k,0,k)$   
 $(0,k,k)$

2



покриване  
свообудността с  
наказанието и т.

1сл.  $x > y$

$$\left[ \begin{array}{l} y < 25 \\ x < 50 \\ x+20 > 30 \\ y+20 > 25 \\ y+20 > x \end{array} \right]$$

покриване със втора зона

$$\rightarrow \begin{array}{l} y < 25 \\ 30 < x \\ x < y+20 \end{array}$$

няма фигура

$$S_{\Delta} = \frac{15 \times 15}{2}$$

$$P(y < 25 \text{ и } x > 30 \text{ и } x < y+20) = \frac{15^2}{2} \quad (\text{за } x > y)$$

симетрично за  $x < y$   $\frac{15^2}{2}$

$$\rightarrow \text{Отг. } \frac{15^2}{80^2}$$