зад. 8 A, B, C

$\mathbb{P}(A) = 0{,}6$; $\mathbb{P}(B) = 0{,}3$; $\mathbb{P}(C) = 0{,}1$

„заявката е изпратена към принтер A"

$\mathbb{P}(E \mid A) = 1\%$

$E = \{$станала е грешка$\}$

$\mathbb{P}(E \mid B) = 5\%$

$\mathbb{P}(E \mid C) = 4\%$

$\mathbb{P}(A \mid E) = ?$

Р-е: * $\mathbb{P}(A \mid B) \overset{def}{=} \dfrac{\mathbb{P}(A \cap B)}{\mathbb{P}(B)}$

$$\mathbb{P}(A \mid E) = \frac{\mathbb{P}(E \mid A) \cdot \mathbb{P}(A)}{\mathbb{P}(E)}$$

$$= \frac{\mathbb{P}(E \mid A)\mathbb{P}(A)}{\mathbb{P}(E \mid A)\mathbb{P}(A) + \mathbb{P}(E \mid B)\mathbb{P}(B) + \mathbb{P}(E \mid C)\mathbb{P}(C)}$$

Заместваме... $\square$

зад. 10 1/4 е верен

$P(\text{знае}) = 90\%$

ако не знае - налучква

$P(\text{да не е знае} \mid \text{правилно}) = ?$

$H_1 = \{\text{знае отгов.}\}$

$H_2 = \overline{H_1}$

$P(H_1) = 90\%$

$P(H_2) = 10\%$

$A = \{\text{отговорил е правилно}\}$

$P(H_2 \mid A) = ?$

Р-е: Бейс

$P(A \mid H_2) = 25\%$ $P(H_2) = 10\%$

$P(A \mid H_1) = 100\%$ $P(H_1) = 90\%$

$$P(H_2 \mid A) = \frac{P(A \mid H_2) P(H_2)}{\sum_{i=1}^{2} P(A \mid H_i) P(H_i)}.$$

$\square$

зад. 11 A, B, C

$A \to 0{,}2$, $B \to 0{,}4$, $C \to 0{,}6$

$D = \{$ущелил е точно $1\}$

$$\mathbb{P}(A \mid D) = ?$$

Р-е: $$\mathbb{P}(A \mid D) = \frac{\mathbb{P}(A \cap D)}{\mathbb{P}(A \cap D) + \mathbb{P}(B \cap D) + \mathbb{P}(C \cap D)}$$

$$\mathbb{P}(A \cap D) = 0{,}2 \cdot 0{,}6 \cdot 0{,}4$$
$$+ 0{,}8 \cdot 0{,}6 \cdot 0{,}4 \cdot 0{,}2 \cdot 0{,}6 \cdot 0{,}4$$
$$+ (0{,}8 \cdot 0{,}6 \cdot 0{,}4)^2 \cdot 0{,}2 \cdot 0{,}6 \cdot 0{,}4$$
$$+ \dots$$
$$= 0{,}2 \cdot 0{,}6 \cdot 0{,}4 \left(1 + q + q^2 + \dots\right)$$

$$q = 0{,}8 \cdot 0{,}6 \cdot 0{,}4$$

$$1 + q + q^2 + \dots = \frac{1}{1-q}$$

$P(B \cap D) = 0{,}8 \cdot 0{,}4 \cdot 0{,}4$ (✗ ✓ ✗)

A – 0,2
B – 0,4
C – 0,6

$+ (0{,}8 \cdot 0{,}6 \cdot 0{,}4) \cdot 0{,}8 \cdot 0{,}4 \cdot 0{,}4 + \dots$ (✗ ✗ ✗ ✗ ✓ ✗)

$= 0{,}8 \cdot 0{,}4 \cdot 0{,}4 (1 + q + q^2 + \dots)$

$P(C \cap D) = 0{,}8 \cdot 0{,}6 \cdot 0{,}6 (1 + q + q^2 + \dots)$

Ответ: $\dfrac{0{,}2 \cdot 0{,}6 \cdot 0{,}4 \left(\frac{1}{1-q}\right)}{(0{,}2 \cdot 0{,}6 \cdot 0{,}4 + 0{,}8 \cdot 0{,}4 \cdot 0{,}4 + 0{,}8 \cdot 0{,}6 \cdot 0{,}6) \cdot \frac{1}{1-q}}$ (✓ ✗ ✗ ✗ ✓ ✗ ✗ ✗ ✓)

зад. 13 55 М
45 Н

$A = \{$взима изпита$\}$

$P(A|M) = 0,4$

$P(A|H) = 0,7$

След избрали сме избрали

$\vee\vee\times$

$P(H_3|\vee\vee\times)$

$\parallel$

$P(\text{да сме избрали } 3\ H \mid \vee\vee\times) = ?$

* $P(3H \mid \vee\vee\vee) > P(3M \mid \vee\vee\vee)$

Решение: Бейс

$H_i = \{$от избраните 3-ма има i момичета$\}$

$P(\vee\vee\times \mid H_0) =$

$3 \cdot 0,4 \cdot 0,4 \cdot 0,6$

$P(H_0) = \frac{55}{100} \cdot \frac{54}{99} \cdot \frac{53}{98}$

$= \binom{55}{3} / \binom{100}{3}$

$= \frac{55 \cdot 54 \cdot 53}{6} / \frac{100 \cdot 99 \cdot 98}{6}$

$P(H_1) = \binom{45}{1}\binom{55}{2} / \binom{100}{3}$; $P(VVX \mid H_1) = 0,4 \cdot 0,4 \cdot 0,3$

1Н, 2М $+ 2 \cdot 0,4 \cdot 0,6 \cdot 0,7$

$P(H_2) = \binom{45}{2}\binom{55}{1} / \binom{100}{3}$; $P(VVX \mid H_2) = (0,7)^2 \cdot 0,6$

2Н, 1М $+ 0,4 \cdot 0,7 \cdot 0,4 \cdot 2$

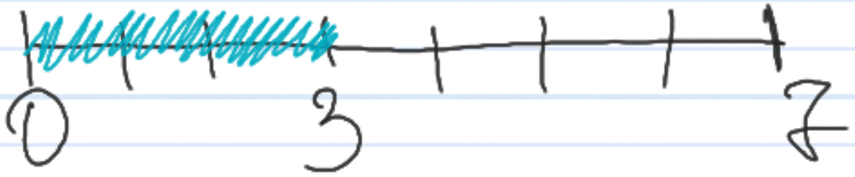
$P(H_3) = \binom{45}{3} / \binom{100}{3}$; $P(VVX \mid H_3) = 3 \cdot (0,7)^2 \cdot 0,3$

Н – 0,7; М – 0,4

Заместване в Бейс

$$\mathbb{P}(H_3 \mid vvx) = \frac{\mathbb{P}(vvx \mid H_3)\cdot \mathbb{P}(H_3)}{\sum_{i=0}^{3} \mathbb{P}(vvx \mid H_i)\,\mathbb{P}(H_i)}.$$

геом. в-ет



X – случ.

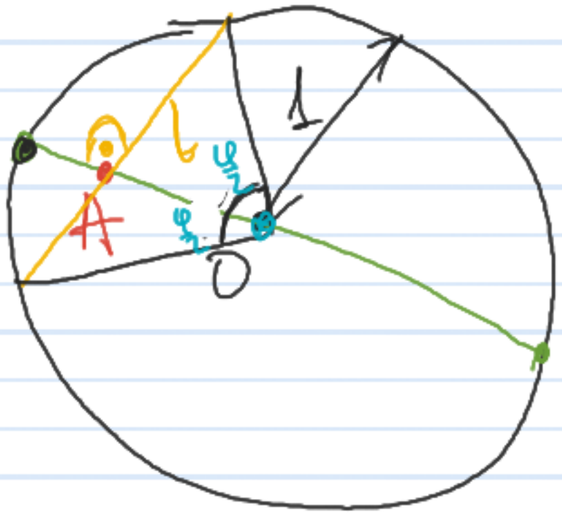
$$\mathbb{P}(X<3) = \frac{3}{7}$$

μ – мярка (лице)

$$\mathbb{P}(A) = \frac{\mu(A)}{\mu(\Omega)}$$

Фил 4

Зад. 1

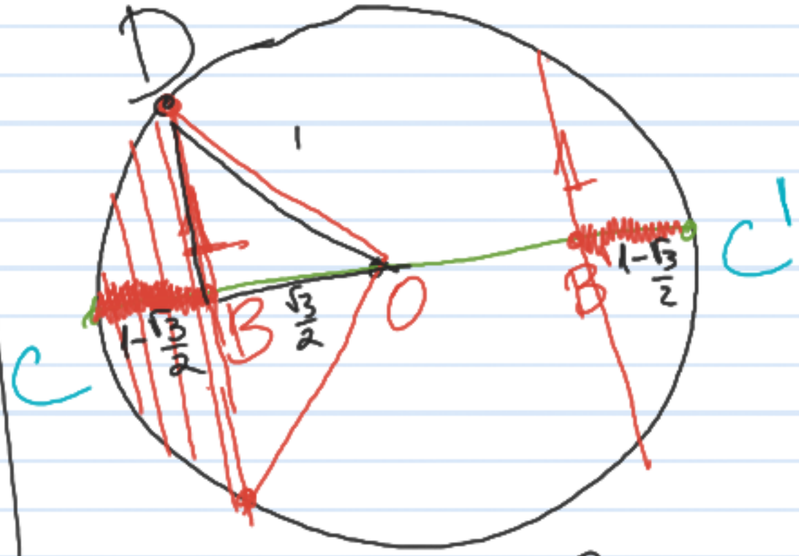


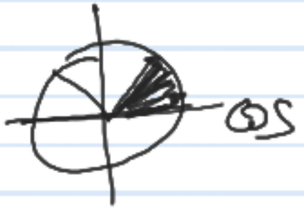
$P(\text{хорда} < 1) = ?$

$l < 1 \iff 1^2 + 1^2 - 2\cos\varphi < 1$

$\iff \cos\varphi > \frac{1}{2}$

$\varphi \in (0^\circ, 60^\circ)$





Зад. 2

$OB^2 = 1 - \left(\frac{1}{2}\right)^2$ от Питагор за $\triangle OBD$

$= \frac{3}{4}$

$\Rightarrow OB = \frac{\sqrt{3}}{2}$

Сл. отг. е $1 - \frac{\sqrt{3}}{2} = \frac{2-\sqrt{3}}{2} = \frac{BC + B'C'}{CC'}$

зад.2 A и B м/у 0 и 24

A – 6 часа, за да бъде разт.

B – 4 часа, —"—

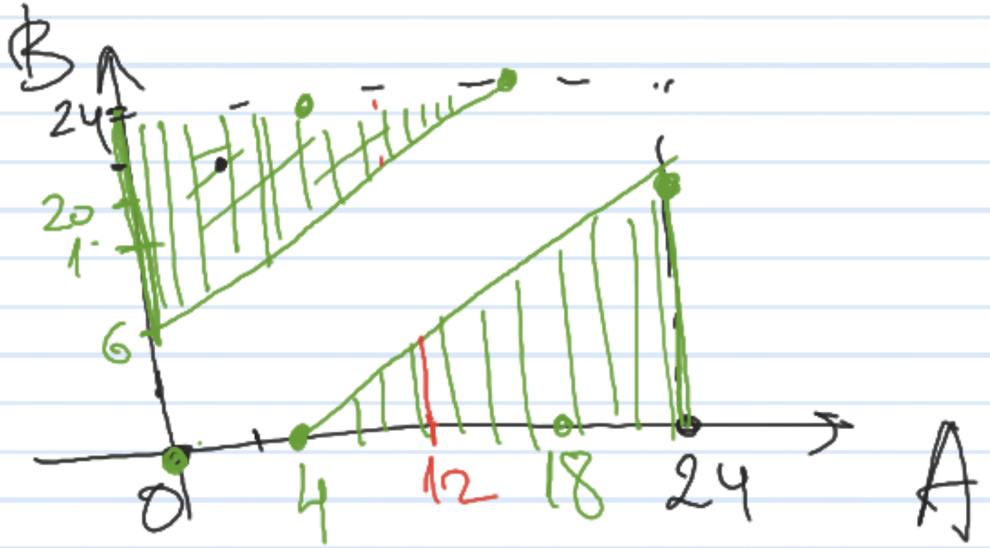
$\mathbb{P}$(да не се засекат) = ?

Ако A дойде в 0

B може от 6 до 24 → 18

Ако A дойде в 12

B може от 0 до 8, 18 до 24 → 14



Отговор: $\frac{S_{зелено}}{S_{\square}}$

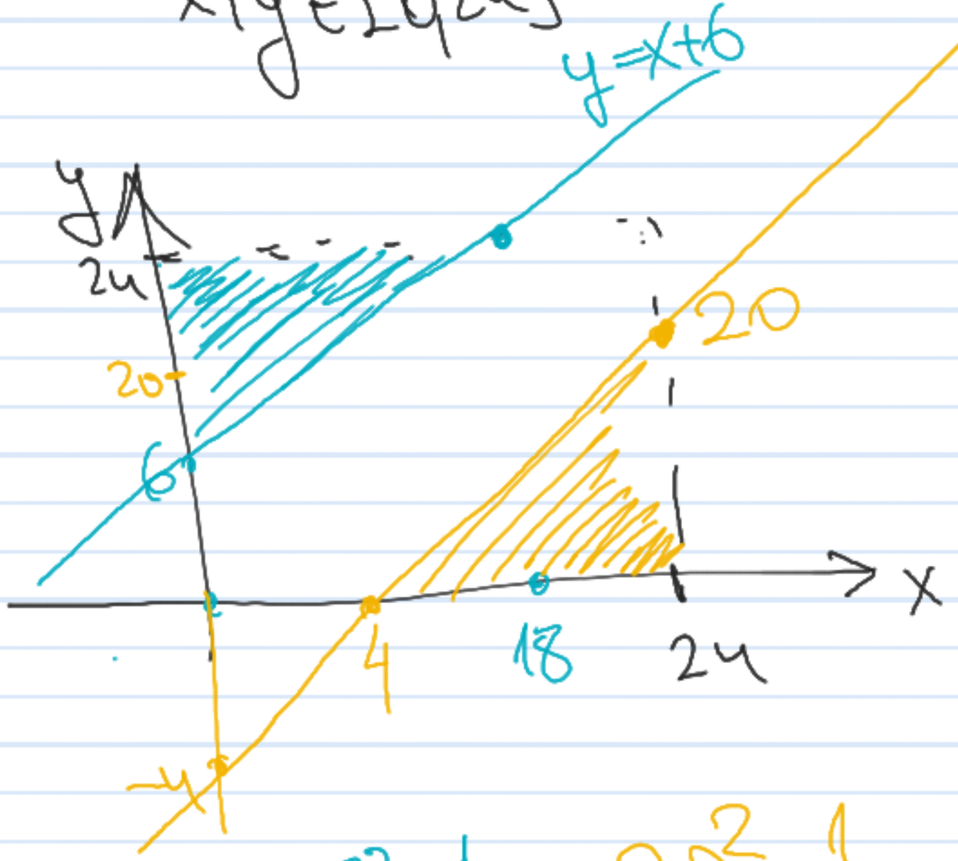
$$= \frac{18^2 \cdot \frac{1}{2} + 20^2 \cdot \frac{1}{2}}{24^2}$$

$$\Omega = \{(x,y) : 0 \le x,y \le 24\}$$

$$\left| \begin{array}{l} 0 \le x,y \le 24 \\ y > x+6 \text{ или } y < x-4 \end{array} \right.$$

$y > x+6$ или $y \le x-4$

$x, y \in [0;24]$



Отв: $\dfrac{18^2 \cdot \frac{1}{2} + 20^2 \cdot \frac{1}{2}}{24^2}$.

Зад. 3

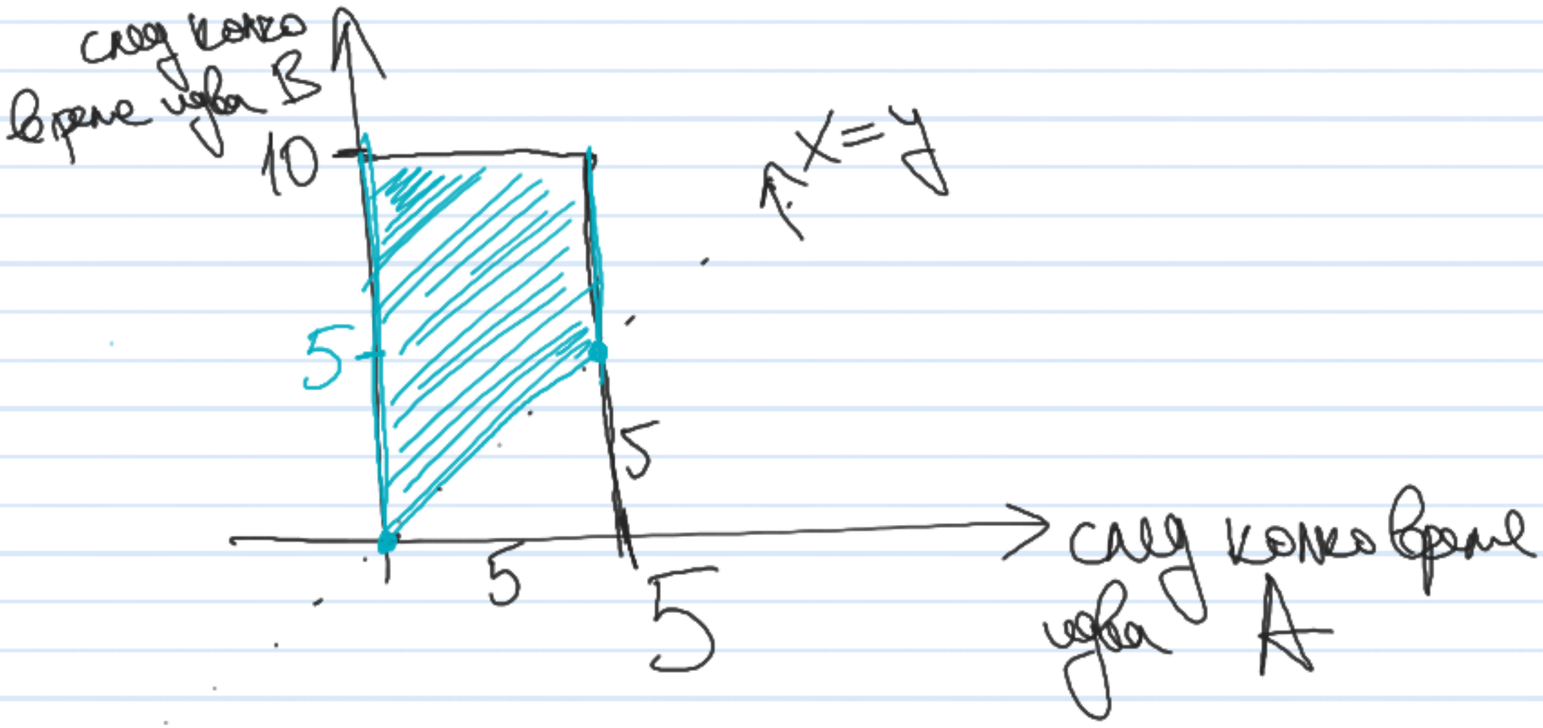
Зад 3

A – на 5 min

B – на 10 min

а) $P(A \text{ преди } B) = ?$

б) $P(\text{да заспане} \le 2 \text{ min}) = ?$



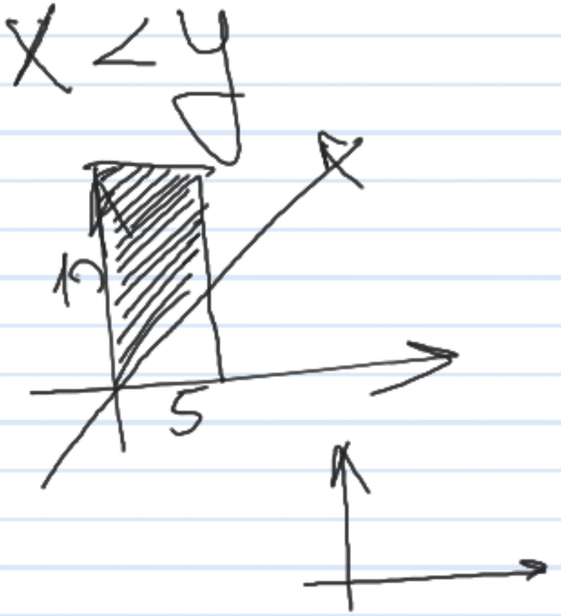
Отговор: $\frac{S_{фав}}{S_{\Omega}}$

$= \frac{50 - \frac{5^2}{2}}{50} = 1 - \frac{25}{100}$

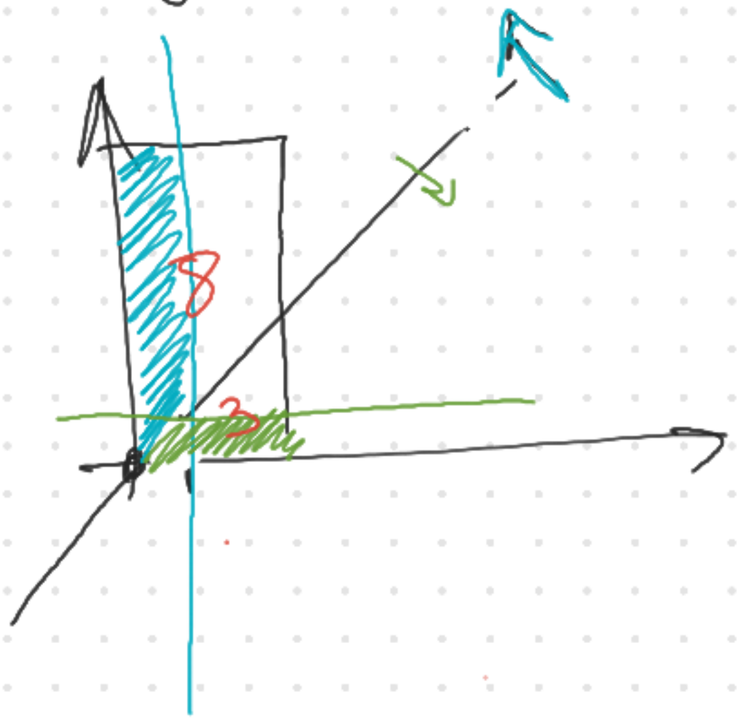
$= \frac{75}{100} = \frac{3}{4}$.

$\Omega = \{(x,y): \begin{matrix} 0 \le x \le 5 \\ 0 \le y \le 10 \end{matrix}\}$

$X < Y$



$\min(x,y) < 2 \rightarrow$ $x<y$ и $x<2$ / $y<x$ и $y<2$



$$O_{тр.} = \frac{50-3\cdot 8}{50} = \frac{26}{50} = \frac{13}{25}$$