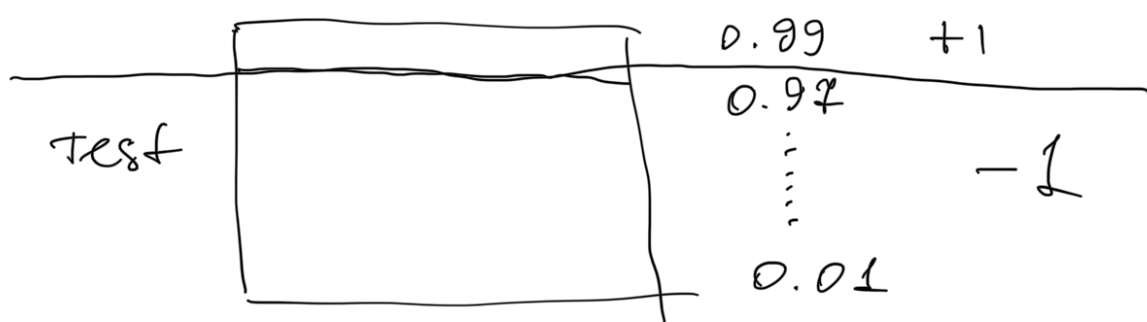


$$F = \frac{2 \cdot p_r \cdot \Gamma_{ec}}{p_r + \Gamma_{ec}}$$

$$\Gamma_{ec} = 1 \quad p_r - \text{маленький}$$

$$p_r \approx 1 \quad \Gamma_{ec} \approx 0$$



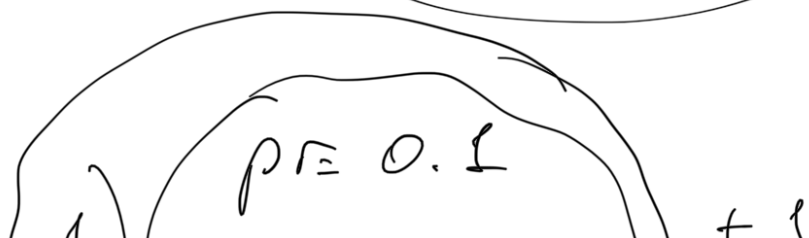
$$p_r = 0.7$$

$$p_r = 0.73$$

$$\Gamma_{ec} = 0.8$$

$$\Gamma_{ec} = 0.79$$

$$F = \frac{p_r + \Gamma_{ec}}{2}$$



$$\frac{1}{2} = 0.5$$

$$\left(\left(\leftarrow \right) \left(\Gamma_{ec} = 0.9 \right) \right) \leftarrow$$

$$\frac{0.5 + 0.5}{2} = 0.5$$

$$2) \begin{cases} pr = 0.5 \\ \Gamma_{ec} = 0.5 \end{cases}$$

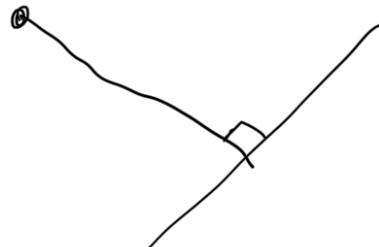
$$\frac{0.1 \cdot 0.9 \cdot 2}{1} = 0.18 \quad 1$$

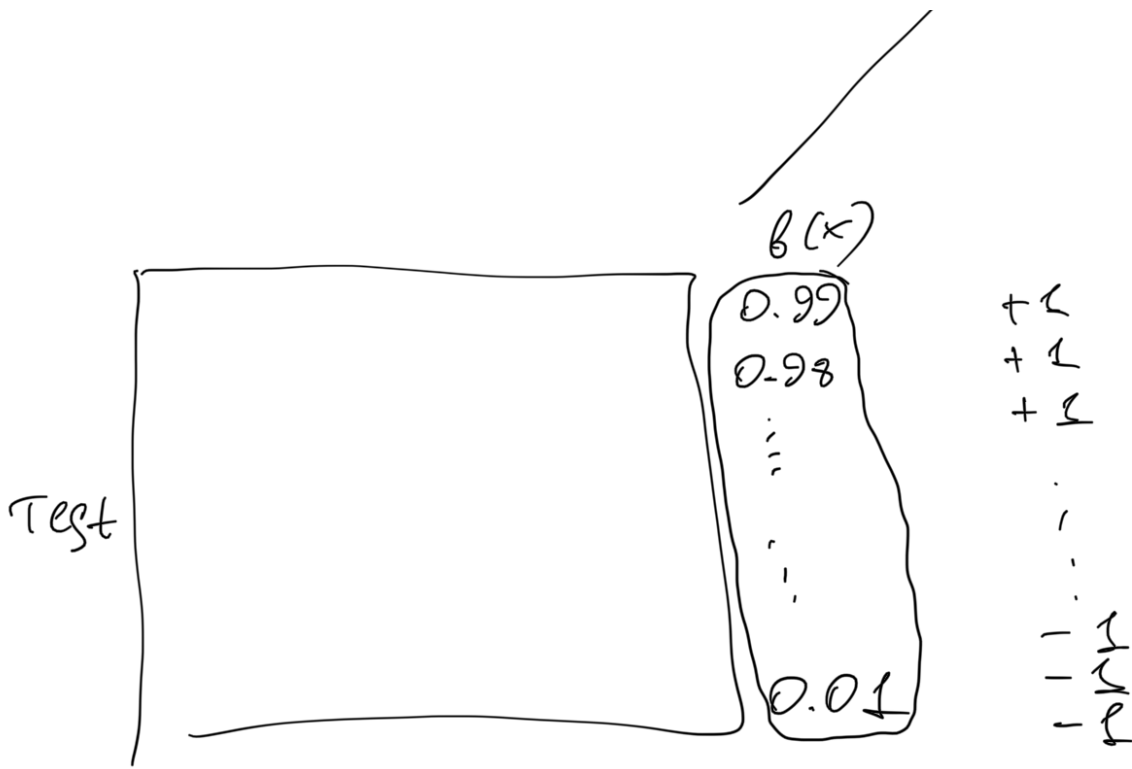
$$\frac{0.5 \cdot 0.5 \cdot 2}{1} = 0.5 \quad 2$$

Метрики ранжирования

$$a(x) = [\underbrace{b(x)}_{\langle w, x \rangle} \geq t]$$

$$\langle w, x \rangle$$





AUC - ROC.

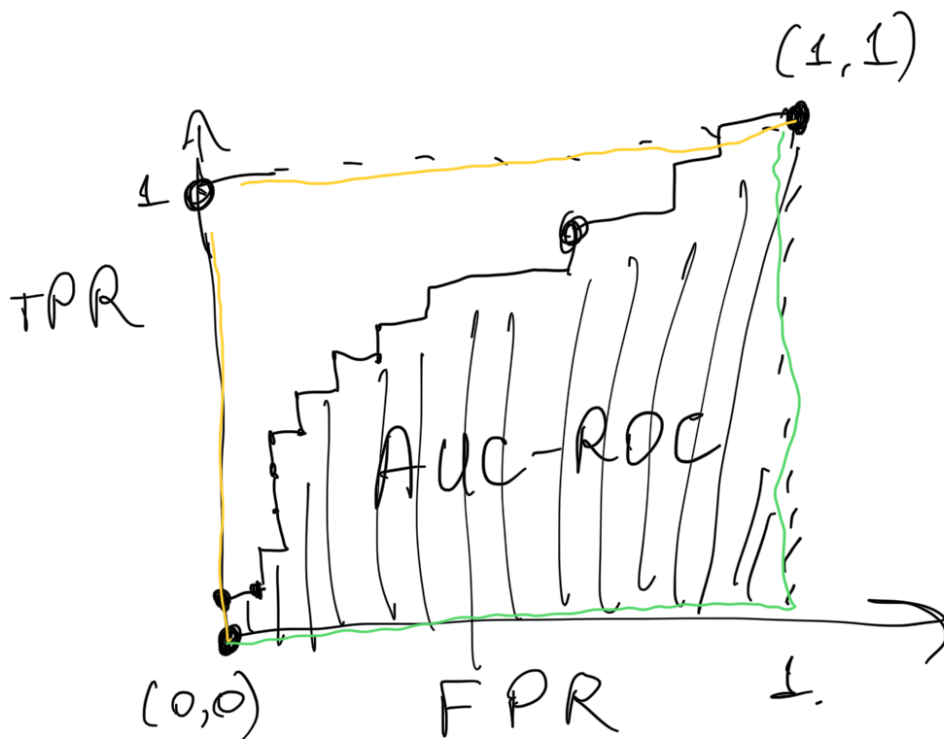
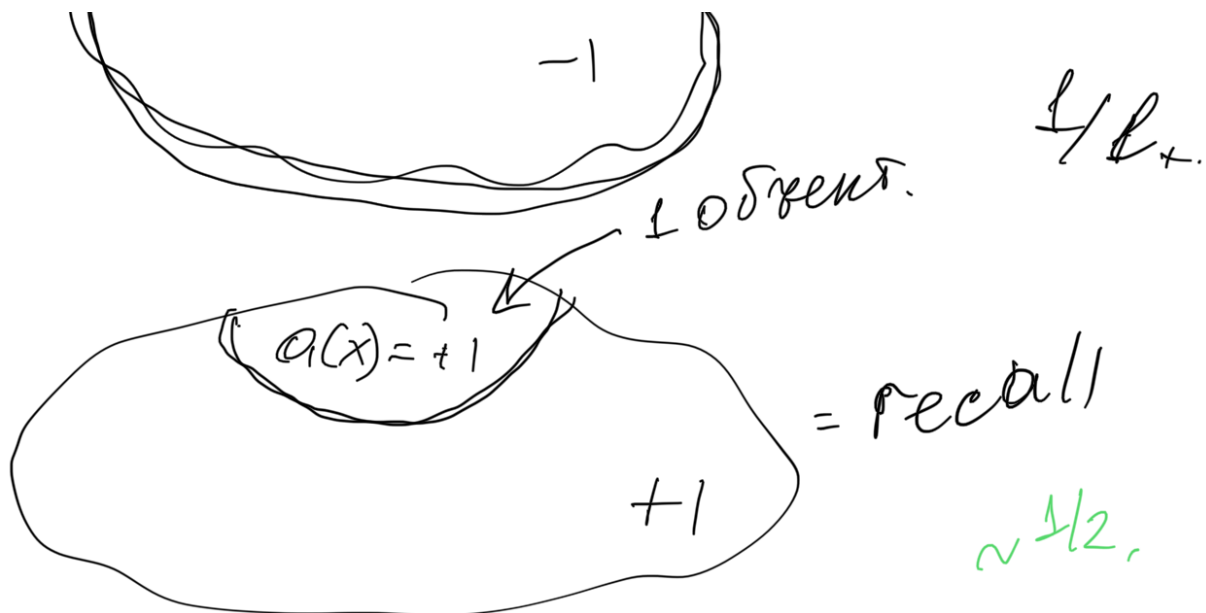
$$\underline{FPR} = \frac{FP}{FP + TN}$$

$$\underline{TPR} = \frac{TP}{TP + FN}$$

recall

	$y = +1$	$y = -1$
$a(x) = +1$	TP	FP
$a(x) = -1$	FN	TN

~~1/c.~~



1)	2)
+1	-1
+1	-1
+1	-1
-1	+1
-1	+1
-1	+1
-1	+1

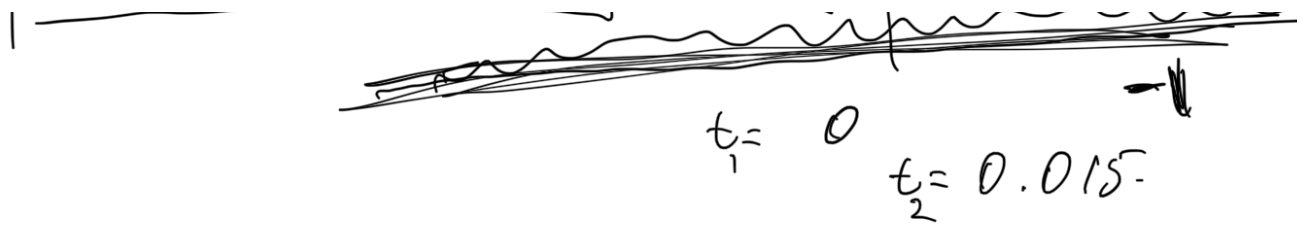
$$a(x) = [b(x) \geq t]$$

$$\text{TPR} = 0$$

$$\text{FPR} = 0$$

test

	$b(x)$	
+1	0.99	FPR = 0
-1	0.98	
-1	0.96	
+1	0.96	
+1	0.02	
	0.01	



$\frac{1}{l_{+1}}$

l_{+} - количество объектов
класса +1

l_{-} - количество объектов
класса -1

$$\text{AUC-ROC}[b(x)] = 0.2$$

$$\text{AUC-ROC}[1 - b(x)] = 0.2$$

$$\text{AUC ROC } b(x) = 0.93$$

$$\text{AUC ROC } 2 \cdot b(x) = 0.93$$

$$92 \cdot b(x) + 7.$$

Должно верно упорядочиваться

map.

$$b(x_1) = 0.2 \quad y_1 = -1$$

$$b(x_2) = 0.4 \quad y_2 = +1$$

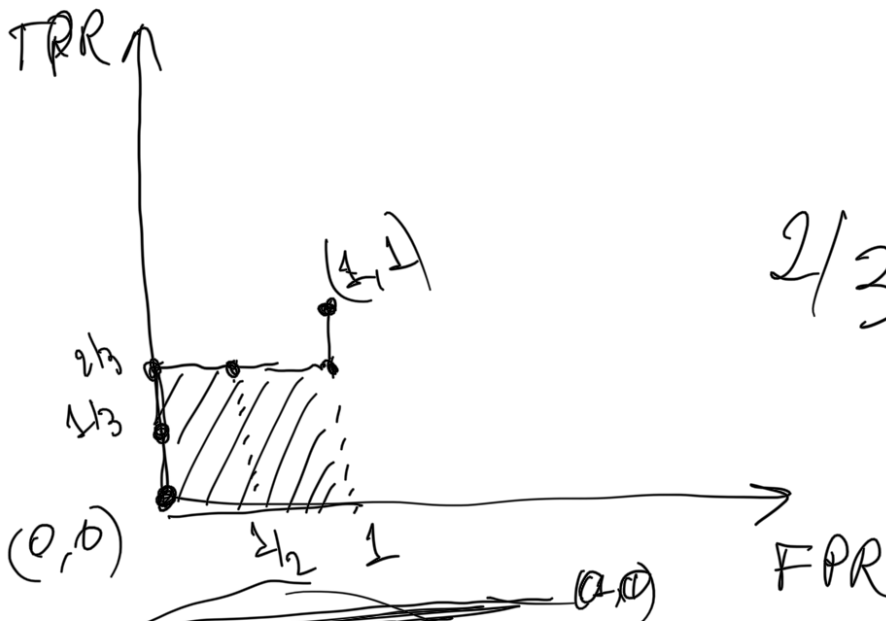
$$b(x_3) = 0.1 \quad y_3 = -1$$

$$b(x_4) = 0.7 \quad y_4 = +1$$

$$b(x_5) = 0.05 \quad y_5 = +1$$

$$\frac{2+2+0}{3} = 2$$

$$4/6 = 2/3$$



$$0.7 \quad (+1)$$

$$0.4 \quad (+1)$$

$$0.2 \quad (-1)$$

$$0.1 \quad (-1)$$

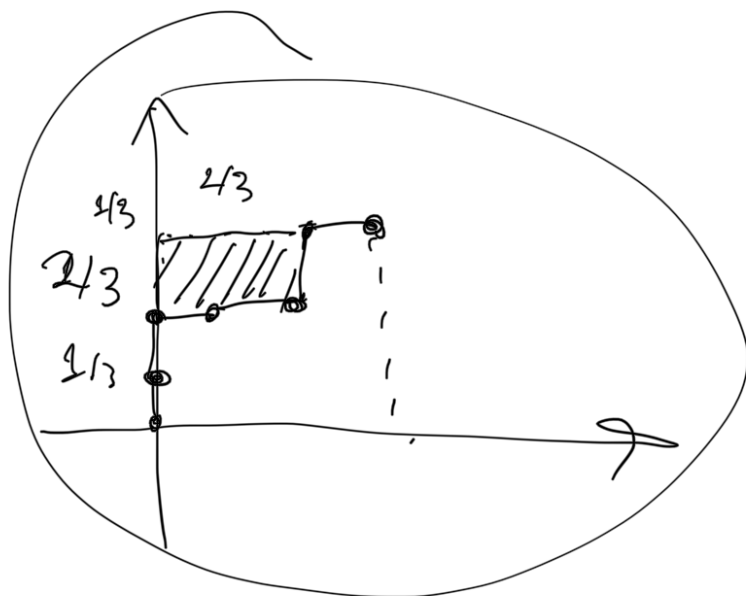
$$1/l_+ = 1/3$$

$$1/l_- = 1/2$$

$$\frac{0.05 \text{ (} +1 \text{)}}{0.01} = 5$$

(ϕ, ϕ)

$$\frac{3 + 3 + 1}{3 \cdot 3} = \frac{7}{9}$$



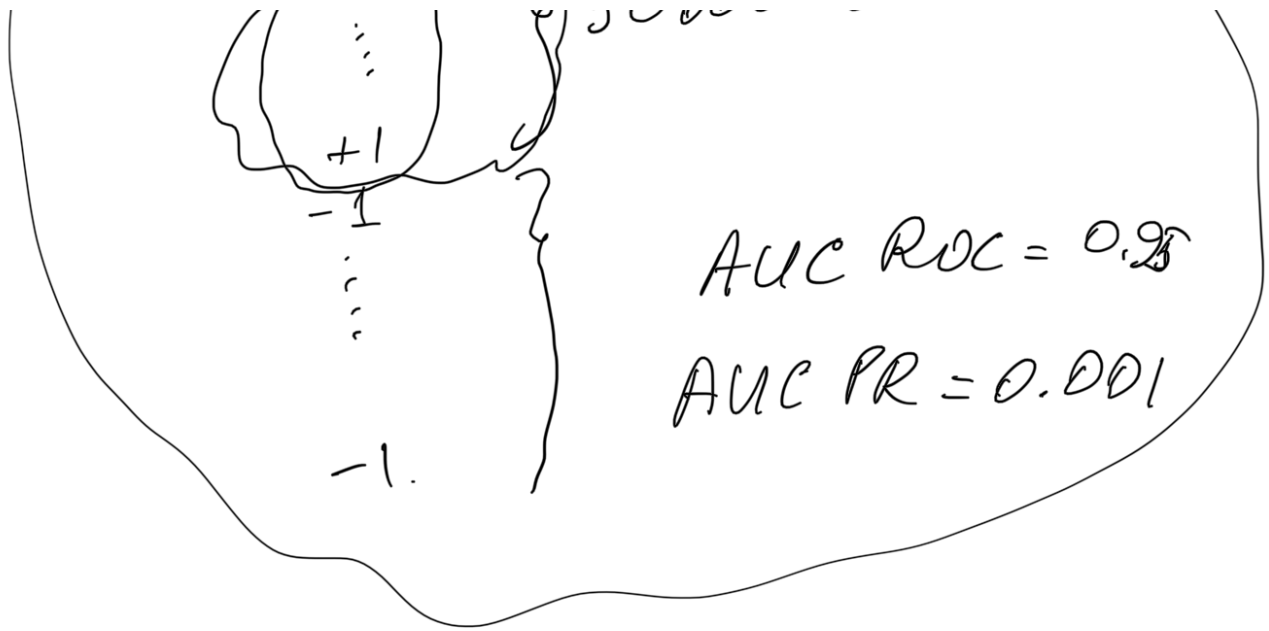
$$\frac{2}{9} \quad 1 - \frac{2}{9} = \frac{7}{9}$$

$$\frac{10000000}{100} = 100000$$

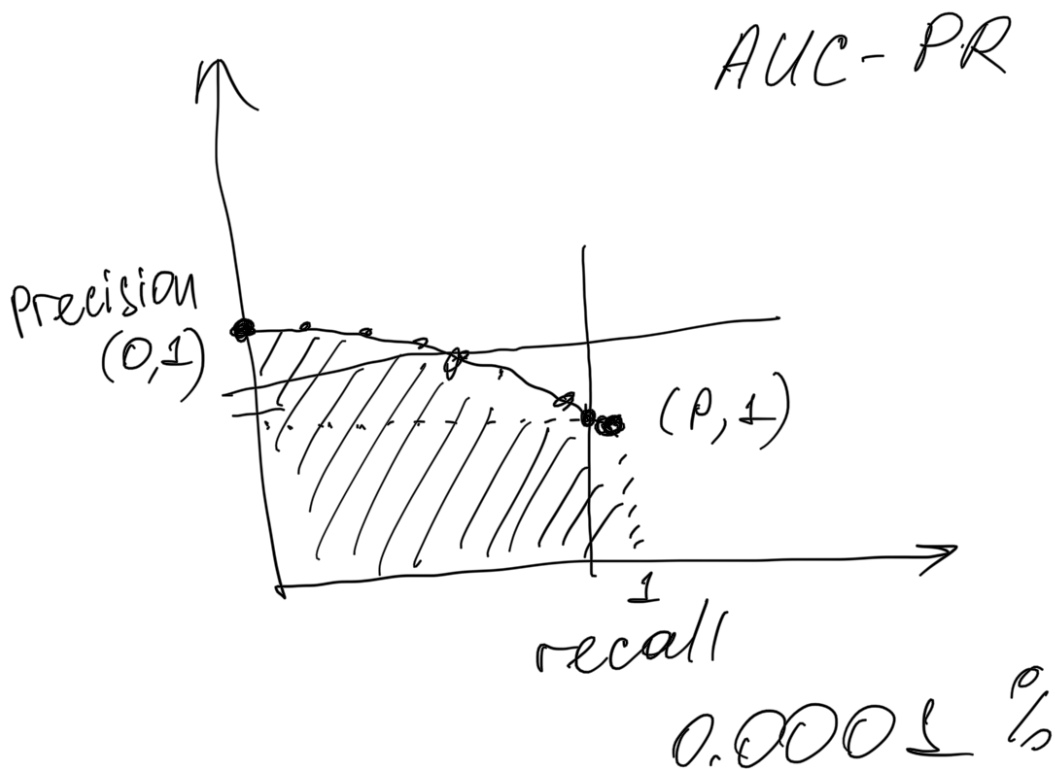
-1
 $+1$

$$\frac{0.26}{0.95}$$





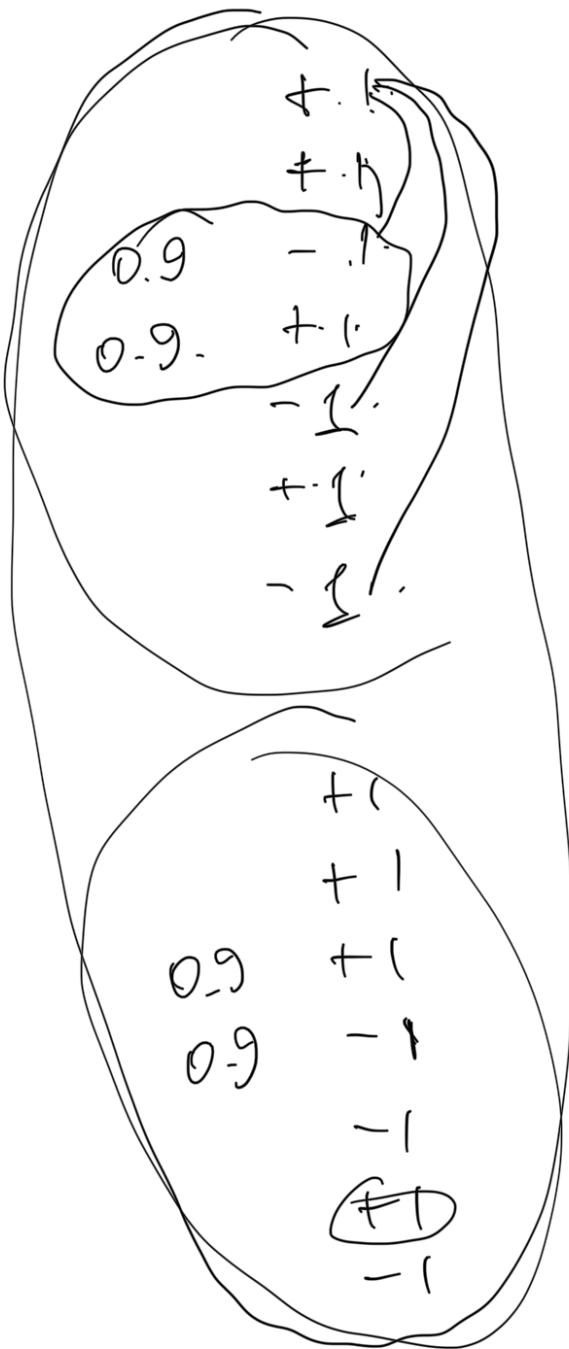
Precision - Recall кривая



0



$$\frac{3+3+2+1}{12} = \frac{9}{12}$$



$$\frac{9.5}{12}$$

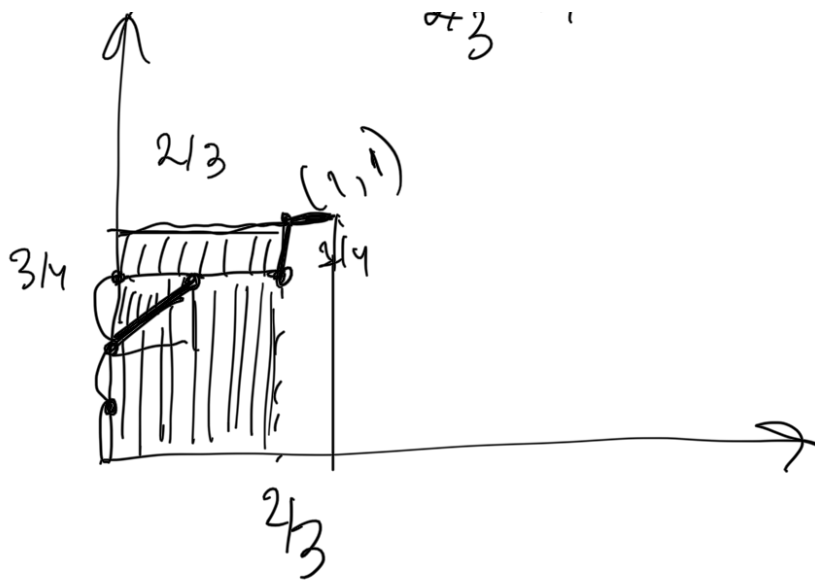
$$\frac{3+3+3+1}{12} = \frac{10}{12}$$

$$\frac{0.5}{12}$$

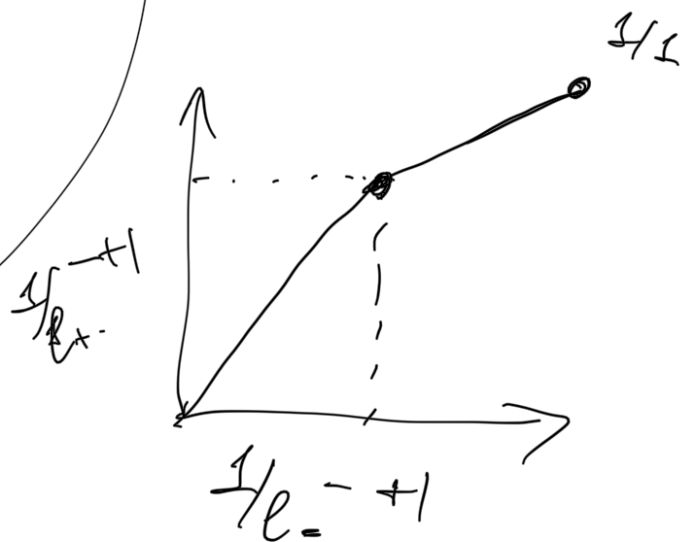
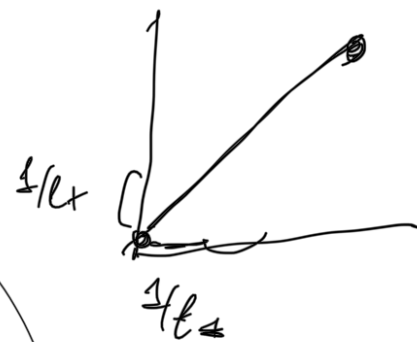
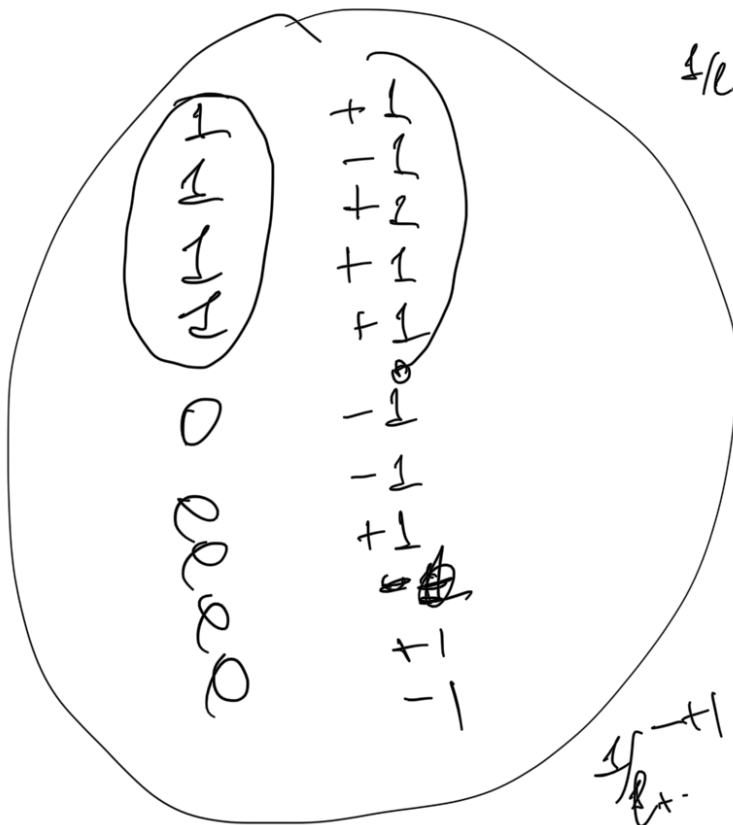
$$\frac{2.5}{12}$$

$$\frac{1}{4} = \frac{2}{12}$$

$$\frac{3}{4}$$



$$1 - \frac{2.5}{12} = \frac{9.5}{12}$$



predict_proba[:, 1]

