

1	X	-1	1	2	4	6	7
	y	-1	2	3	3	5	8

$$\sum x = 19 \quad \sum y = 20 \quad \sum x^2 = 105 \quad \sum y^2 = 110$$

$$\sum xy = 107$$

$$B_0 = \frac{(20 \cdot 105 - 19 \cdot 107)}{6 \cdot 105 - 19^2} = \frac{670}{269} = .249$$

$$B_1 =$$

$$\frac{6 \cdot 107 - 19 \cdot 20}{6 \cdot 105 - 19^2} = \frac{262}{269} = .974$$

$$\hat{y} = .249 + .974x$$

$$\text{let } x = 5$$

$$y = 5.119$$

$$b) \quad z = \frac{e^{(.249 + .974x)}}{1 + e^{(.249 + .974x)}}$$

X	-1	1	2	4	6	7
z	.326	.773	.900	.984	.998	.999

Range of z vals $0 \leq z \leq 1$
Logistic Regression

2 tossed 6 times let X_k be heads

k	0	1	2	3	4	5	6
P_k	1	6	15	20	15	6	1
$N(\eta, \sigma)$.016	.085	.233	.325	.233	.085	.016

$$\sigma = \frac{1}{2}\sqrt{6} = 1.224$$

$$\eta = \sum_{i=1}^6 x_i$$

$$\eta = \frac{6}{2} = 3$$

$$N(\eta, \sigma) = \frac{1}{1.224\sqrt{2\pi}} e^{-\frac{(k-3)^2}{2(1.224)^2}}$$

$$\mu = 70 \text{ Kg} \quad \sigma = 10 \text{ Kg}$$

$$a) \frac{10}{\sqrt{100}} = 1 \quad \mu = 70$$

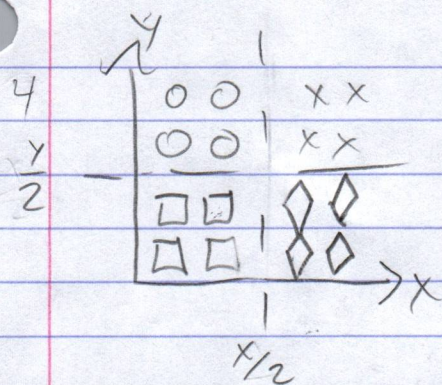
Central Limit theorem

$$\mu_{\bar{x}} = \mu$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

$$b) \frac{10}{\sqrt{200}} = .707 \quad \mu = 70$$

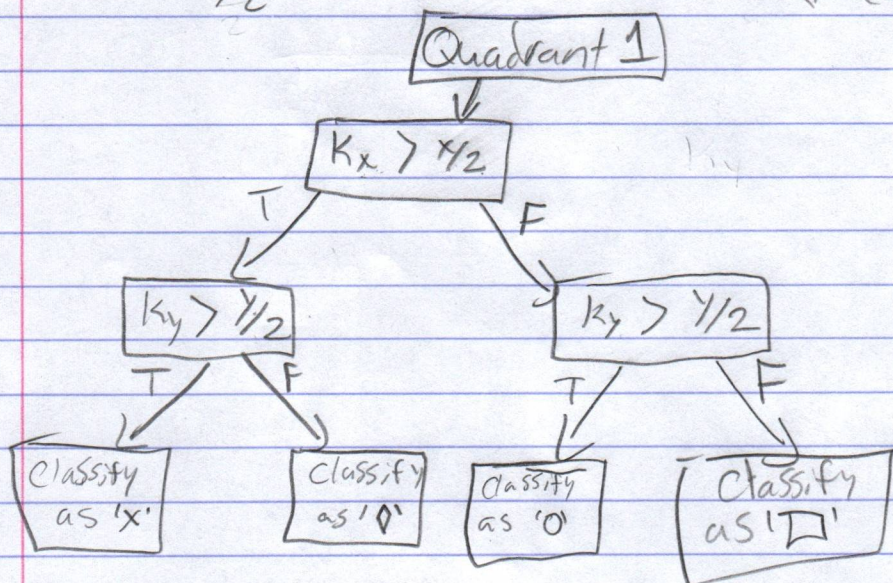
$$\frac{10}{\sqrt{300}} = .577 \quad \mu = 70$$



Linear multi-class

One vs rest? 4 binary class

$o \text{ vs } (x, \square, \diamond)$
 $\square \text{ vs } (o, x, \diamond)$
 $x \text{ vs } (o, \square, \diamond)$
 $\diamond \text{ vs } (o, \square, x)$



b) if $K_x > \frac{x}{2} \& K_y > \frac{y}{2}$ then 'x'
 if $K_x > \frac{x}{2} \& \text{not } K_y > \frac{y}{2}$ then '◇'
 if $\text{not } K_x > \frac{x}{2} \& K_y > \frac{y}{2}$ then 'o'
 if $\text{not } K_x > \frac{x}{2} \& \text{not } K_y > \frac{y}{2}$ then '□'