II/ $F_{xy}(x,y) \stackrel{DEF}{=} F(X \le x, Y \le y)$

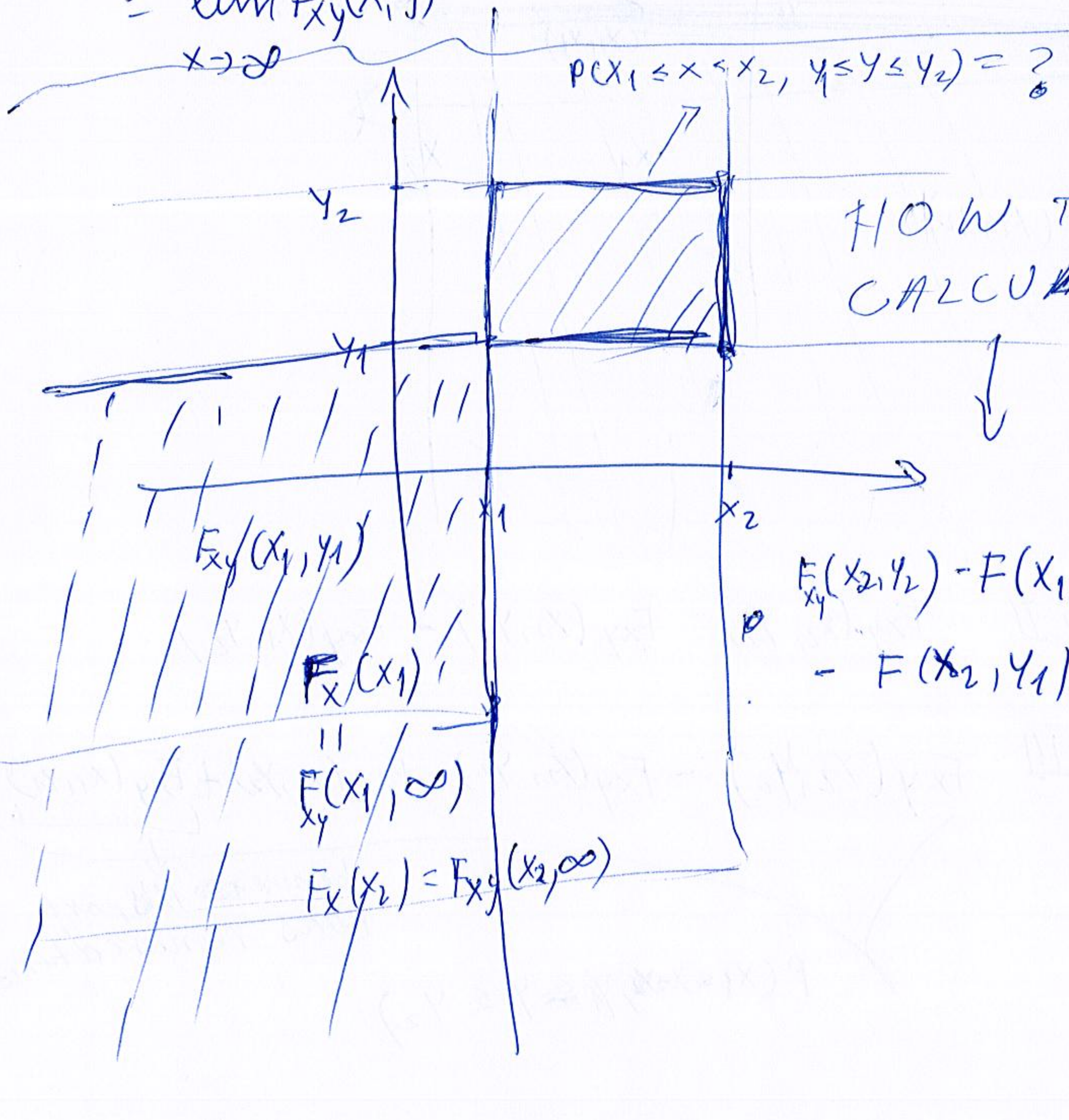
Hence,

$$F_x(x) = P(X \le x) = P(X \le x \wedge Y \le \infty) = F_{xy}(x,\infty)$$

$$= \lim_{y \to \infty} F_{xy}(x,y)$$

$$F_y(y) = P(Y \le y) = P(X \le \infty, Y \le y) = F_{xy}(\infty, y) =$$

$$= \lim_{x \to \infty} F_{xy}(x,y)$$



HOW TO CALCULATE

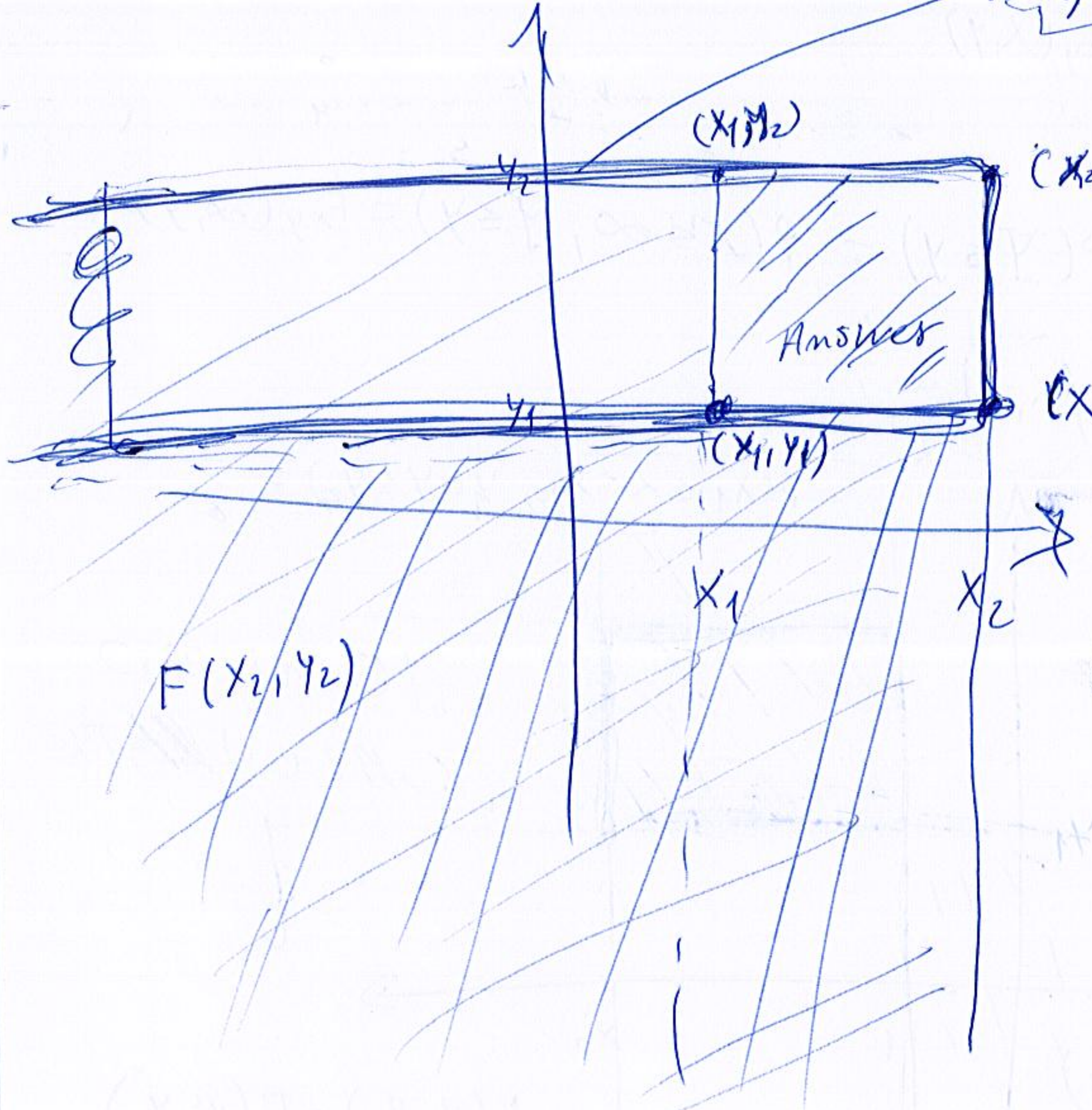
$$F_{xy}(x_2, y_2) - F(x_1, y_2)$$

$$- F(x_2, y_1) + F(x_1, y_1)$$

$P(x_1 \le X \le x_2, \; y_1 \le Y \le y_2) = ?$

$F_{xy}(x_2, y_2) - F_{xy}(x_2, y_1)$

Step (I)

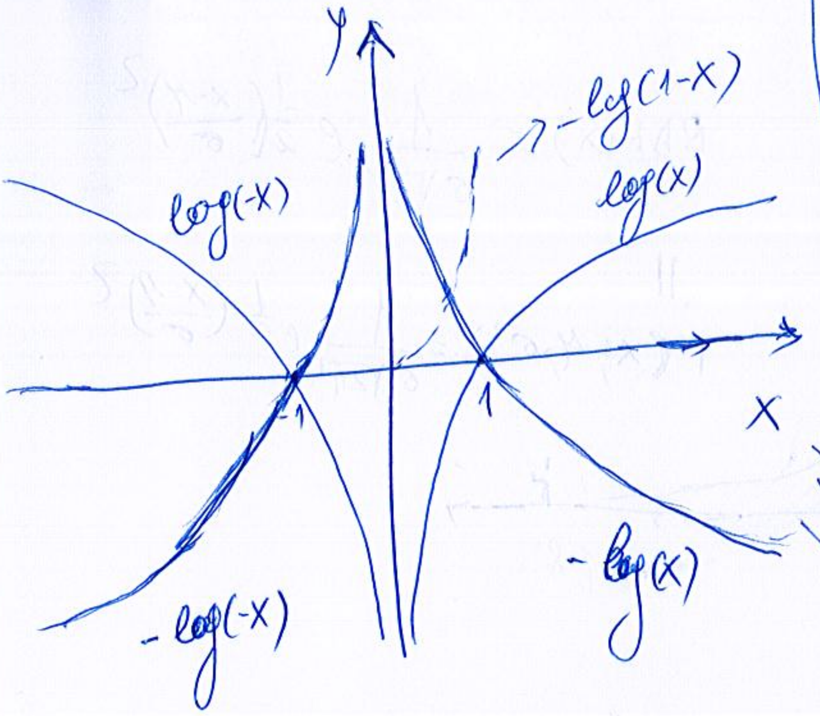


Step II $\quad F_{xy}(x_2, y_2) - F_{xy}(x_2, y_1) - F_{xy}(x_1, y_2)$

Step III $\quad F_{xy}(x_2, y_2) - F_{xy}(x_2, y_1) - F_{xy}(x_1, y_2) + F_{xy}(x_1, y_1)$

because this part was removed twice

$P(x_1 \le X \le x_2, y_1 \le Y \le y_2)$



$f : [a,b] \rightarrow \mathbb{R} \quad f \in C^0[a,b]$

$\forall x_1 x_2 \in [a,b]$

$\forall \lambda \in [0,1]$

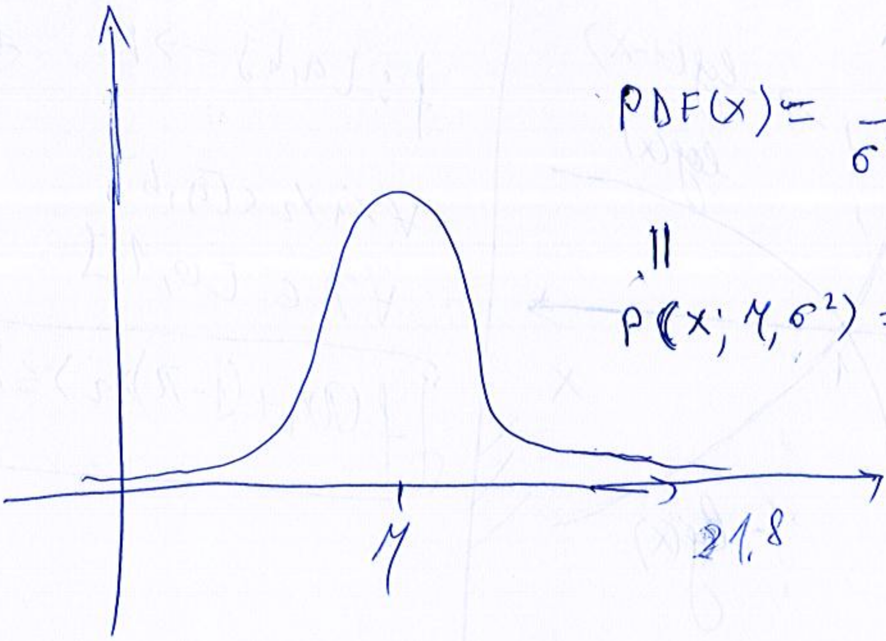
$$\boxed{f(\lambda x_1 + (1-\lambda)x_2) \leq \lambda f(x_1) + (1-\lambda)f(x_2)}$$

Convex function is a CONTINOUS FUNCTION whose value at midpoint of every interval in its domain does not exceed the arithmetic mean of its values at the end of interval

$f : [a,b] \rightarrow \mathbb{R}; \; f \in C^0; \; \cancel{\lambda \in]0,1[} \; \forall x_1 x_2 \in [a,b]$

$\forall \lambda \in]0,1[$

$$f(\lambda x_1 + (1-\lambda)x_2) \leq \lambda f(x_1) + (1-\lambda) f(x_2)$$



$$PDF(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$

$$\parallel$$

$$p(x;\mu,\sigma^2) = \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$

$$F_{xy}(x,y) = P(X \le x, Y \le y)$$

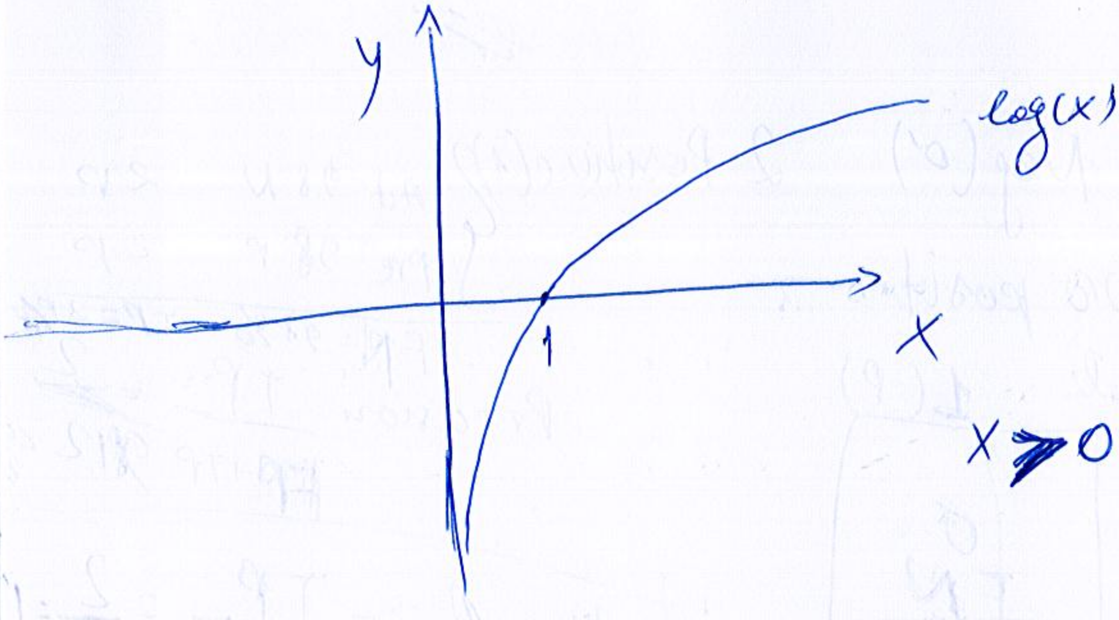
$$F_X(x, \;) = P(X \le x, Y \le \infty)$$

$$F_X(x) = P(X \le x) = P(X \le x \wedge Y \le \infty)$$

$$= F_{xy}(x, \infty)$$

$$F_Y(y) = F_{xy}(\infty, y)$$

$$F_Y(y) = P(Y \le y) = P(X \le \infty, Y \le y)$$

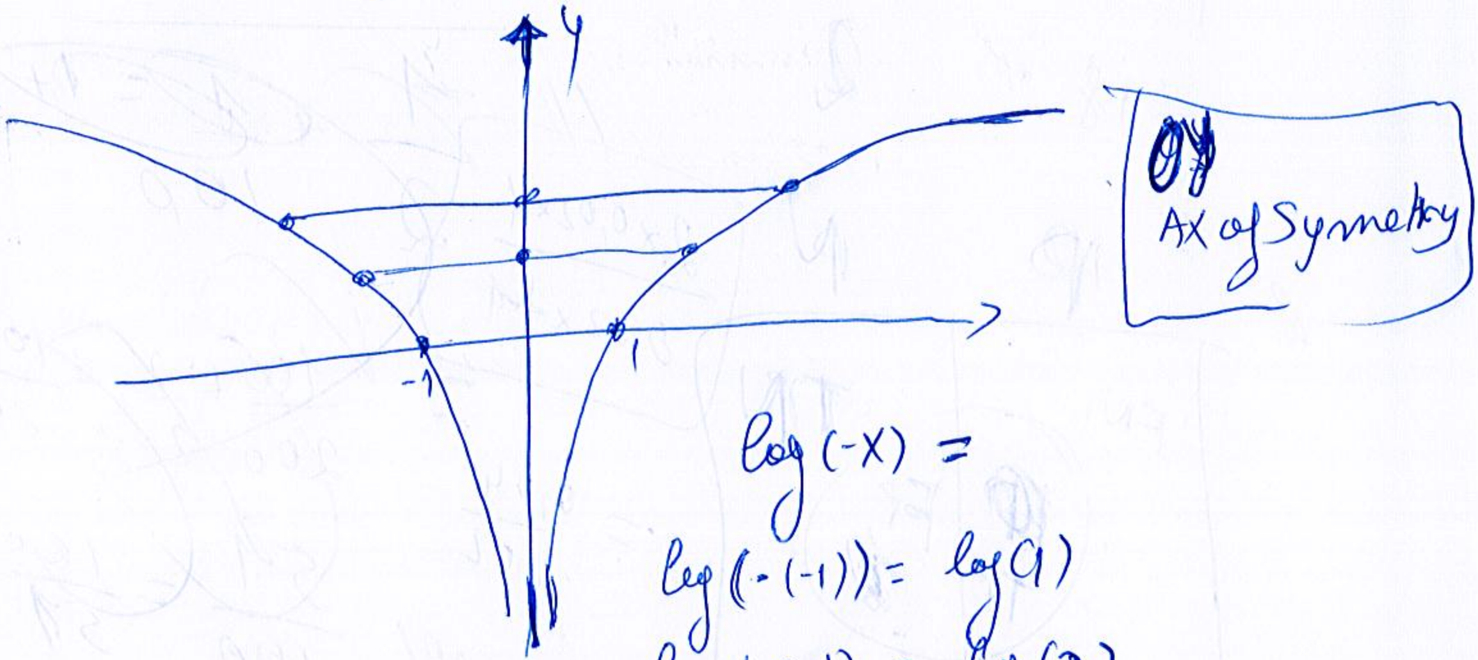


$x > 0 \Leftrightarrow x \in]0,+\infty[$

$\log(-x)$?

$-x$ must be $>0 \Leftrightarrow -x > 0 \Leftrightarrow x<0$

Thus, if we have $x<0$ does exist $\log(x)$



$\log(-x) =$

$\log(-(-1)) = \log(1)$

$\log(-(-2)) = \log(2)$

Actual 98 Neg(0) 2 Positive(1)

Predicted 100 posit

Act 98 N 2 P

pre 98 P 2 P

FN = 98% TP = 2%

Precision $\frac{TP}{FP+TP} = \frac{2}{98+2} = 2\%$

		Actual 0 (Neg)	1 (P)
Pre	0	0 TN	0 FN
	1	98 FP	2 TP

Recall $= \frac{TP}{TP+FN} = \frac{2}{2+0} = 1$

$= 2\% \cdot 100\% = 100$

$F_1 = \frac{2 \cdot 2\% \cdot 100\%}{2\% + 100\%}$

98 2

P N

FN FN

TP FP 2

$\frac{2 \times 0{,}02 \times 1}{0{,}02 \times 1}$

$= \frac{0{,}04}{1{,}02}$

$\frac{1}{\frac{1}{2} + \frac{1}{100}} = \frac{1+2}{100}$

$= \frac{100}{200} + \frac{2}{200} = \frac{102}{200}$

$\frac{51}{100} = \frac{100}{51}$

FP = 98%

prec

what is outside the eye is not seen (predicted) as positiv

(1)

$$\sum_{k=1}^{n} 2k = 2+4+6+\dots+2n = \frac{(2+2n)}{2}\cdot n = \frac{2(n+1)n}{2} = (n+1)n$$

$\Downarrow$ $\frac{2n}{2}$ terms

$\Updownarrow$

$\Rightarrow$ n term

2°

$$\sum_{k=1}^{n} k = 1+2+3+\dots+n = \frac{1+n}{2}\cdot n = \frac{(1+n)n}{2}$$

Ex. $2+4+6+8 = (1+2+3+4)\cdot 2$

$$\boxed{\sum_{k=1}^{n} 2k = 2\sum_{k=1}^{n} k}$$

$\underbrace{1+\underbrace{2+3+4}_{6}+5}_{6}$

$(1+5)\cdot\frac{5}{2}$ $\quad (1+5)\cdot 2.5 = (1+5)\cdot 2 + \frac{1+5}{2}$

$= 6\cdot 2 + 3$

$1, \boxed{2}, 3, \boxed{4}, 5, \boxed{6}, 7, \boxed{8}, 9, 10, 11, 12$

$1, 12 = 13 = 1+n$

$2, 11 = 13$

$3, 10 = 13$

$\vdots$

$\frac{(1+n)n}{2}$

$\sum_1^{n} 2k = 2\sum_1^{n} p$

$2, 4, 6, 8 \ldots n (=24)$

$n/2$ term

$S = \frac{(2+n)}{2} \cdot \frac{n}{2}$

$\frac{n(n+1)}{2}$

4 first even numbers

$2 + 4 + 6 + \boxed{8} = 20$

$1+2+3+4 + \cancel{\ldots+8} = \cancel{\frac{(1+8)\cdot 8}{2}} = 36$

4 first numbers

~~2×4~~ number

$= \frac{(1+4)\cdot 4}{2} = 10$

$\sum_{k=1}^{n} k = \frac{1}{2}\sum_{k=1}^{n} 2k$

$2+4+6+8 = 2\cdot(1+2+3+4)$

$\frac{(1+n)n}{2} = \frac{1}{2}\sum_{k=1}^{n} 2$

$2 = 1+1$

$4 = 1+3 = 2+2$

$6 = 2+4 = 3+3$

$8 = 3+5 = 4+4$

$2 = 1+1$

$4 = 2+2$

$6 = 3+3$

$8 = 4+4$

$\sum_{k=1}^{n} k = \frac{1}{2}\sum_{k=1}^{n} 2k$

$\sum_{k=1}^{n} k = \sum_{k=1}^{n} k$

$\sum n$ first even $= 2\sum$ first nu

$\frac{2+4+6+8+10}{2} = \frac{2}{2} + \frac{4}{2} + \frac{6}{2} \ldots$

$\sum_{1}^{n/2} 2k = 2\sum_1^{n} k$

$$p(z,\theta) = p(z|\theta)\cdot p(\theta)$$
$$= p(\theta|z)\cdot p(z)$$

$$mar(z) = \sum_{\theta\in\Theta} p(z,\theta) = \sum_{\theta\in\Theta} p(\theta|z)\,p(z)$$

$$E_{z\sim p(z;\theta)}[z] = \sum_{z\in Z} z\cdot p(z;\theta) = \sum z\cdot p(z|\theta)$$
$$= \sum z\cdot p(z)$$

$$E[x] = \sum x\, p(x)$$
$$E[g(x)] = \sum g(x)\cdot p(x)$$