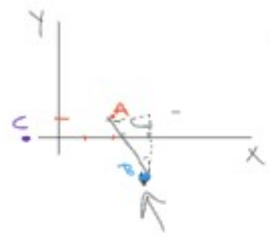
Exercises in german

1. Distance between points



A = (2,1)
B = (3,-2)
C = (-1,0)

Euclidean $d(A,B)$ // pitagoras

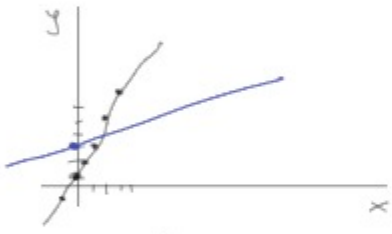
$\sqrt{3^2+1^2} = \sqrt{10}$

$d(A,C)$

$d(B,C)$

$d_1(A,B) = 3+1 = 4$

2. Basic Functions



2.2. Linear Function

$y = 2x+1$

x	y
0	1
1	3
2	5
3	7
4	9
-1	-1
0'5	2

slope, y-intercept

$y = m \cdot x + n$

$y = \frac{1}{2}x + 3$

$y = -3x + 8$

$y = 1'80 \cdot x$

$y = 30 \cdot x + 20$ (inquilino)

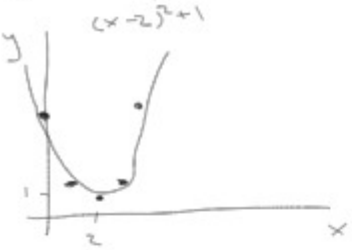
extras luz

x	y
0	20
1	50
2	80
3	110

3. Polynomials

$y = x^2 - 4x + 5$

$(x-2)^2 + 1$

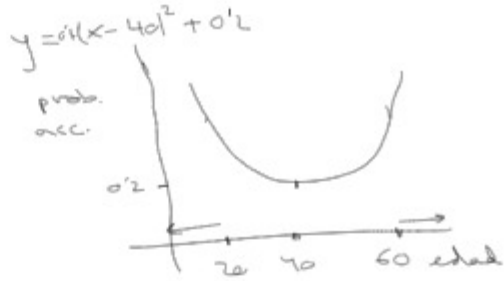


x	y
0	5
1	2
2	1
3	2
4	5

$y = (x-a)^2 + b$

(a,b) vertex

$y = 0'1(x-40)^2 + 0'2$



$y = x^4 - 7x^2 + 3x - 11$

2.4.

$\sqrt{100} = \pm 10$

$\sqrt{1} = \pm 1$

$\sqrt{9} = \pm 3$

$\sqrt{0'01} = 0'1$

$\sqrt{a} = b \iff a = b^2 = b \cdot b$

5. Exponential

$3a+2a$

I_n = inflation by n

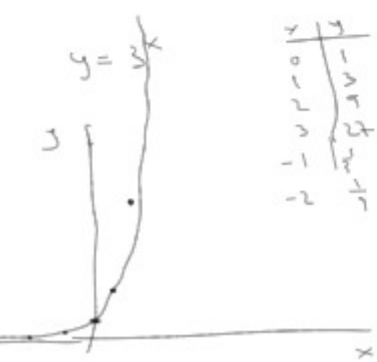
$I_n = 1 \cdot I_{n-1} + 0'1\, I_{n-1} = 1'1\, I_{n-1}$

$I_{n+1} = 1'1\, I_n = 1'1^2 \cdot I_{n-1}$

$I_{n-2} = 1'1^2 \cdot I_n$

$I_{n+10} = 1'1^{10} \cdot I_n$

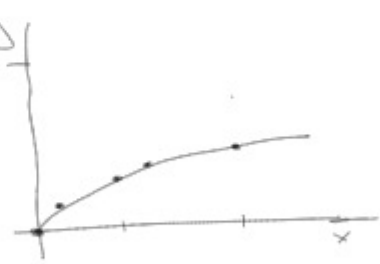
$y = 3^x$



x	y
0	1
1	3
2	9
3	27
-1	$\frac{1}{3}$
-2	$\frac{1}{9}$

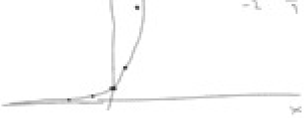
$y = \sqrt{x}$

x	y
0	0
1	1
4	2
9	3
16	4
25	5
5	$\sqrt{5}$



2.6. Logarithm

$10^3 = 1000$



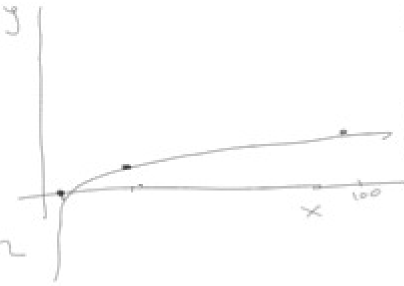
2.6. Logarithm

$10^3 = 1000$

$3 = \log_{10}(1000)$ $\log_2 16 = 4$

$4 = \log_{10}(10000)$

$y = \log_{10}(x)$



x	y
1	0
10	1
100	2
1000	3
10000	4

Log Red

1
1'3
4'6

	Pred	Pred1	Pred2
Es	10	1000	11
It	20	1000	21
Ch	50000	51000	55000

$\log(a \cdot b) = \log a + \log b$

$\log\left(\frac{a}{b}\right) = \log a - \log b$

27. $\sum_{n=3}^{6} n = 3+4+5+6$

$\sum_{n=-2}^{2} (n^2 - n + 1) = (4-(-2)+1) + ((-1)^2+1+1) + \dots (4-2+1)$

$\sum_{n=0}^{4} a_n x^n = a_0 + a_1 x + a_2 x^2 + a_3 x^3 + a_4 x^4$

3. $^5C_2 = \frac{5!}{3!\,2!} = \frac{5 \cdot 4}{2} = 10$

$\frac{5 \cdot 4}{2} = \frac{20}{2} = 10$

Theory:

$V_2^{21} = \frac{21!}{19!} = \frac{21 \cdot 20 \cdot 19!}{19!}$

$V_3^{10} = \frac{10!}{7!} = \frac{10 \cdot 9 \cdot 8 \cdot 7!}{7!}$

$P_{10} = 10 \cdot 9 \cdot 8 \cdots 2 \cdot 1$

99
99
99

$\frac{100 \cdot 99}{2}$

$C_2^{100} = \frac{100!}{2!\,98!} = \frac{100 \cdot 99 \cdot 98!}{2!\,98!}$

$C_4^{100} = \frac{100!}{4!\,96!} = \frac{100 \cdot 99 \cdot 98 \cdot 97}{4 \cdot 3 \cdot 2}$

Combinatorics

Jaime Bea Juan

1. D ③ [6]
A ②

J S
J M
J S

L S
M
S ↓ 20

$21 \cdot 20 = 420$

2. ABC
ACB
BAC
BCA
CAB
CBA

⑥ ↓ 3!

ABCD

A [ ] 6
B [ ] 6·4
C [ ]
D [ ]

24 = 4!

③③③ = 27
AAA

ABC

$3 \cdot 2 \cdot 1 = 6$

Probabilidad

00000 ⟶ 99999

100.000

$\frac{1}{2}$

$p(1\ átomo) = \frac{1}{100.000}$

	1	2	3	4	5	6
1	✓					
2		✓				
3			✓			
4				✓		
5					✓	
6						✓

$\frac{6}{36} = \frac{1}{6}$

43
34

$\Omega = \{22, 34, 43$

$\{11, 12, 13, \ldots 16$
$21, 22, 23 \ldots$
0
$0, 6\}$

36

$p(A\sim) = \frac{2}{6}$

$p(\sim c) = \frac{2}{6}$

$p(A\sim \cup \sim c) =$

1. $p(10\ heads) = 0'8 \cdot 0'8 \cdots 0'8 = 0'8^{10}$

$p(0\ heads) = 0'2 \cdots 0'2 = 0'2^{10}$

HTTT ⟶ $0'8 \cdot 0'2 \cdot 0'2 \cdot 0'2$
THTT ⟶ $0'2 \cdot 0'8 \cdot 0'2 \cdot 0'2$ } $0'2^3 \cdot 0'8 \cdot 4$

$\binom{N}{1} = \frac{N!}{1!(N-1)!} = N$

H H

$p(1\ heads) = 0'8 \cdot 0'2^9 \cdot 10$

HHTTT ⟶ $0'8^2\ 0'2^3$
H THTT