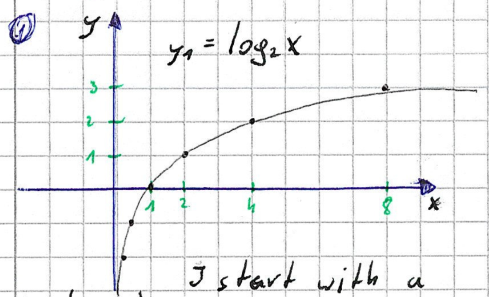
What to say in front of the blackboard – a brief tutorial:

Exercise: Draw the graph of $y = ||\log_2(x-1)|-1|+1$ (each step separately). State the domain and the co-domain of each function.

Solution:

① $y_1 = \log_2 x$

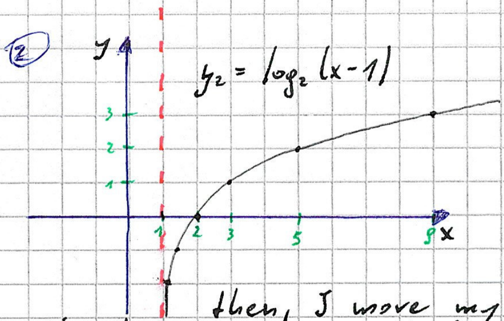


$D_{y_1}: (0, \infty)$
$C_{y_1}: \mathbb{R}$

I start with a logarithm of x with base 2

⇒

② $y_2 = \log_2(x-1)$

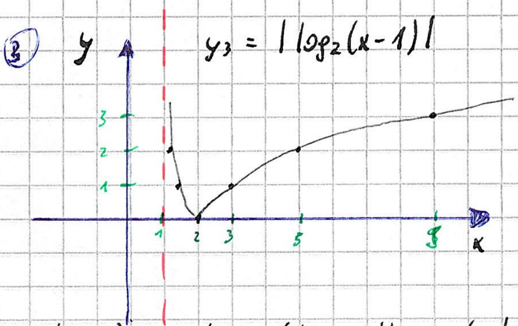


$D_{y_2}: (1, \infty)$
$C_{y_2}: \mathbb{R}$

then, I move my previous graph by 1 to the right

⇓

③ $y_3 = |\log_2(x-1)|$

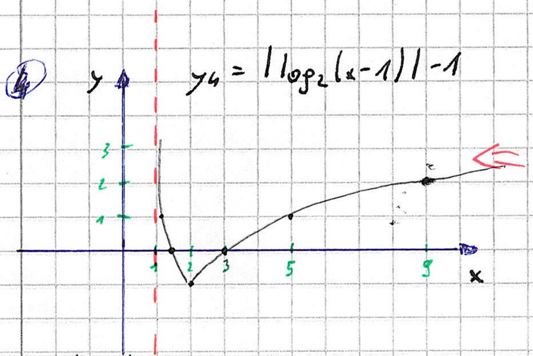


$D_{y_3}: (1, \infty)$
$C_{y_3}: \langle 0, \infty)$

to obtain the absolute value, the negative part of the previous graph goes up

⇐

④ $y_4 = |\log_2(x-1)|-1$

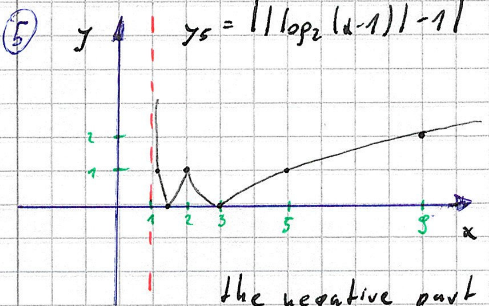


$D_{y_4}: (1, \infty)$
$C_{y_4}: \langle -1, \infty)$

now, the previous graph I move down by 1

⇓

⑤ $y_5 = ||\log_2(x-1)|-1|$

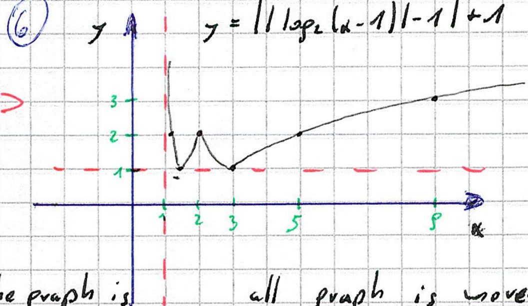


$D_{y_5}: (1, \infty)$
$C_{y_5}: \langle 0, \infty)$

the negative part of the graph is moved up again

⇒

⑥ $y = ||\log_2(x-1)|-1|+1$



all graph is moved up by 1

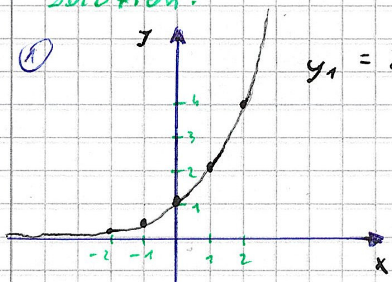
$D_{y_5}: (1, \infty)$
$C_{y_5}: \langle 1, \infty)$

What to say in front of the blackboard – – a brief tutorial:

Exercise: Draw the graph of $y = ||2^{x-3} - 1| - 1|$ (each step separately). State the domain and the co-domain of each function.

Solution:

(1) $y_1 = 2^x$

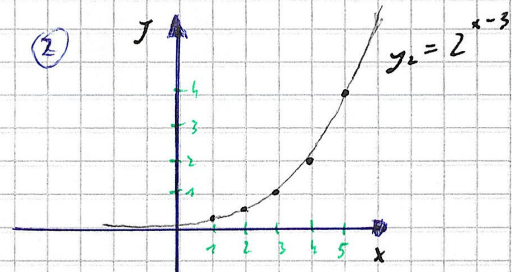


$D_{y_1}: \mathbb{R}$
$C_{y_1}: (0, \infty)$

I start with exponential function 2 to the power of x

=>

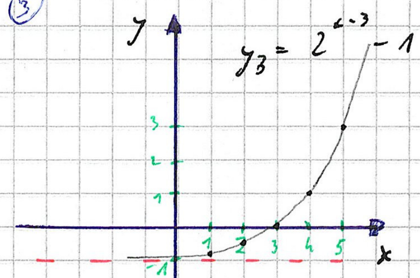
(2) $y_2 = 2^{x-3}$



$D_{y_2}: \mathbb{R}$
$C_{y_2}: (0, \infty)$

then, I move my previous graph by 3 to the right

(3) $y_3 = 2^{x-3} - 1$

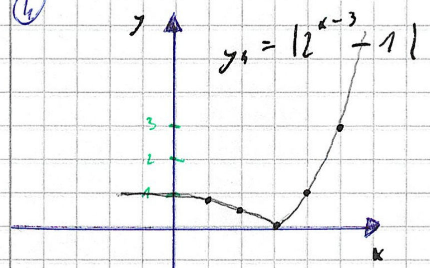


$D_{y_3}: \mathbb{R}$
$C_{y_3}: (0, \infty)$

all graph I move down by 1

<=

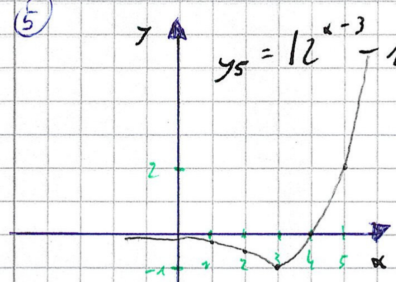
(4) $y_4 = |2^{x-3} - 1|$



$D_{y_4}: \mathbb{R}$
$C_{y_4}: \langle 0, \infty)$

to obtain the absolute value, the negative part of previous graph goes up

(5) $y_5 = |2^{x-3} - 1| - 1$

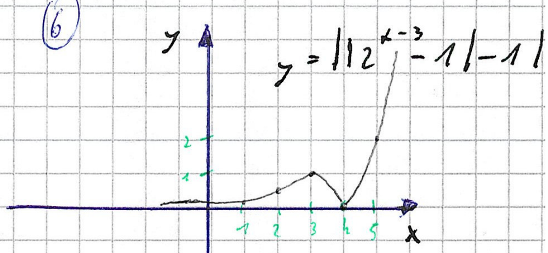


$D_{y_5}: \mathbb{R}$
$C_{y_5}: \langle -1, \infty)$

all graph I move down by

=>

(6) $y = ||2^{x-3} - 1| - 1|$



$D_{y_6}: \mathbb{R}$
$C_{y_6}: \langle 0, \infty)$

the negative part of the graph is moved up again

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