What to say in front of the blackboard - a brief tutorial.

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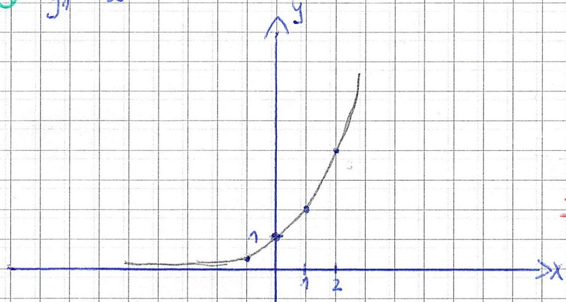
Exercise: Draw the graph of $y = |2^{x-2}|+1$ (each step separavously) and state the domain and the co-domain of each function.

Solution:

① $y_1 = 2^x$

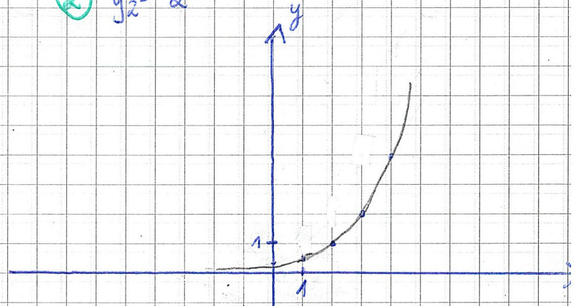


I start with function $y = 2^x$.

$D_{y_1} = \mathbb{R}$

$\mathbb{C}_{y_1} = (0, +\infty)$

② $y_2 = 2^{x-2}$

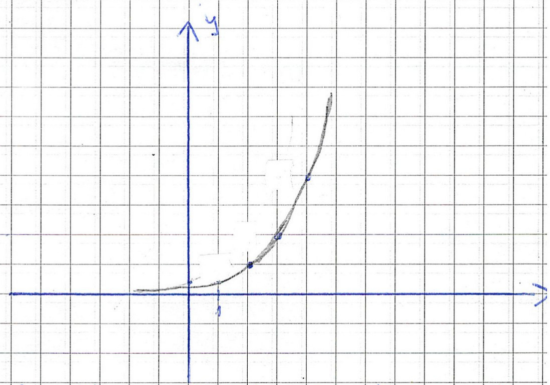


Then, I move my previous graph by 2 to the right.

$D_{y_2} = \mathbb{R}$

$\mathbb{C}_{y_2} = (0, +\infty)$

③ $y_3 = |2^{x-2}|$

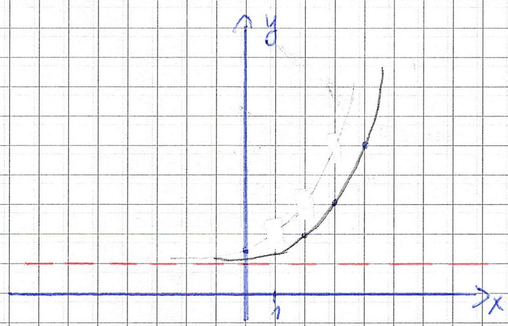


to obtain absolut value, the negative part of the graph should goes up, but I have no negative part, so graph still looks the same.

$D_{y_3} = \mathbb{R}$

$\mathbb{C}_{y_3} = (0, +\infty)$

④ $y_4 = |2^{x-2}|+1$



now, the previous graph moves up by 1 unit

$D_{y_4} = \mathbb{R}$

$\mathbb{C}_{y_4} = (1, +\infty)$

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

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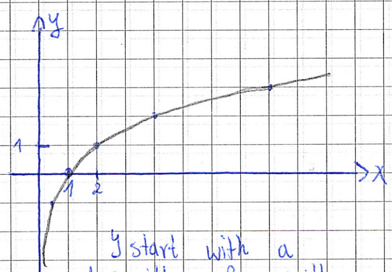
Exercise: Draw the graph of $y = |-\log_2(|x|)| - 3$ (each step separarously), state the domain and the co-domain of each function.

Solution

① $y_1 = \log_2 x$

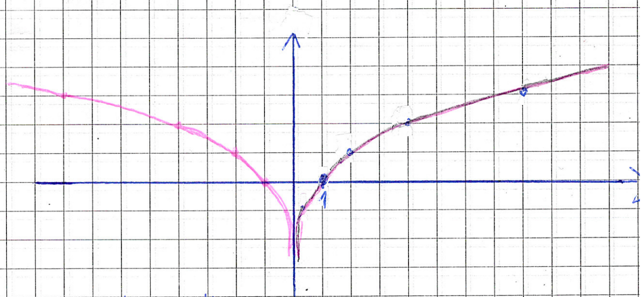


I start with a logarithm of x with base 2.

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

⇒

② $y_2 = \log_2 |x|$



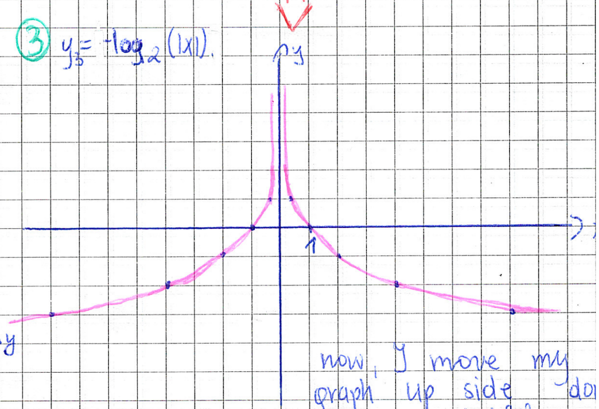
than I draw a graph with x in the absolute value, so right hand-site remains and lef hand-side is a mirror image of right hand-side

$D_{y_2} = (-\infty, 0) \cup (0, \infty)$ or $\mathbb{R} \setminus \{0\}$

$C_{y_2} = \mathbb{R}$

⇓

③ $y_3 = -\log_2(|x|)$



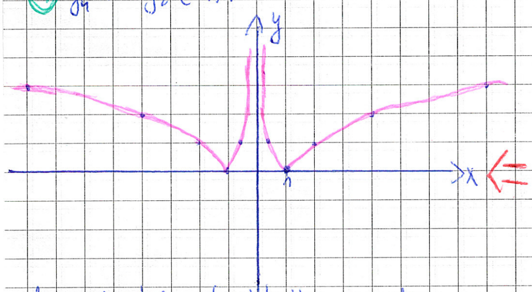
now, I move my graph up side down

$D_{y_3} = \mathbb{R} \setminus \{0\}$

$C_{y_3} = \mathbb{R}$

⇐

④ $y_4 = |-\log_2(|x|)|$



to get $|-\log_2(|x|)|$, the negative part of the graph goes up

$D_{y_4} = \mathbb{R} \setminus \{0\}$

$C_{y_4} = \langle 0, \infty)$

⇓

⑤ $y_5 = |-\log_2(|x|)| - 3$

now I have to the previous graph moves down by 3 units

$D_{y_5} = \mathbb{R} \setminus \{0\}$

$C_{y_5} = \langle -3, \infty)$