EXPONENTIALS

Exponentials

- If $a > 1$ all graphs of the form $y = a^x$ and $y = a^{-x}$ are exponential curves.
- Exponentials of the form $y = a^x$ or $y = a^{-x}$ all pass through $(0, 1)$
- The larger the value of 'a' the steeper the curve.
- For $y = a^x$ or $y = a^{-x}$, the x-axis $(y = 0)$ is an asymptote.

For $y = a^x$ or $y = a^{-x}$

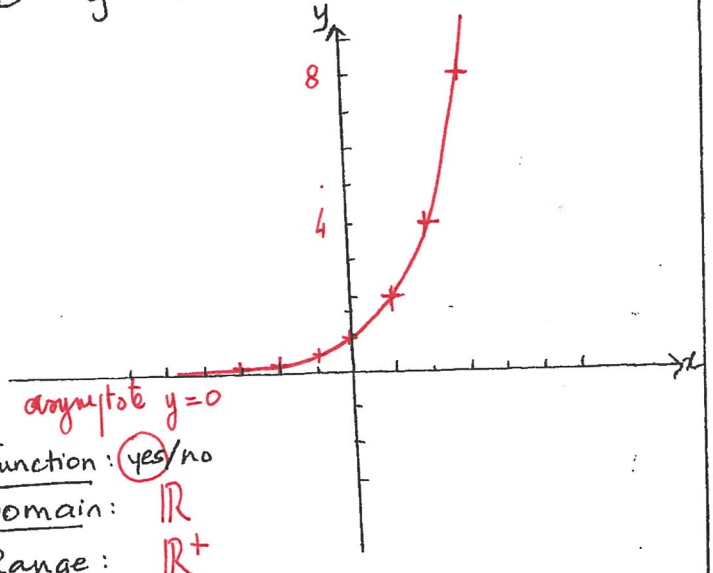
Domain: All real x

Range: All real $y > 0$

Examples:

① $y = 2^x$

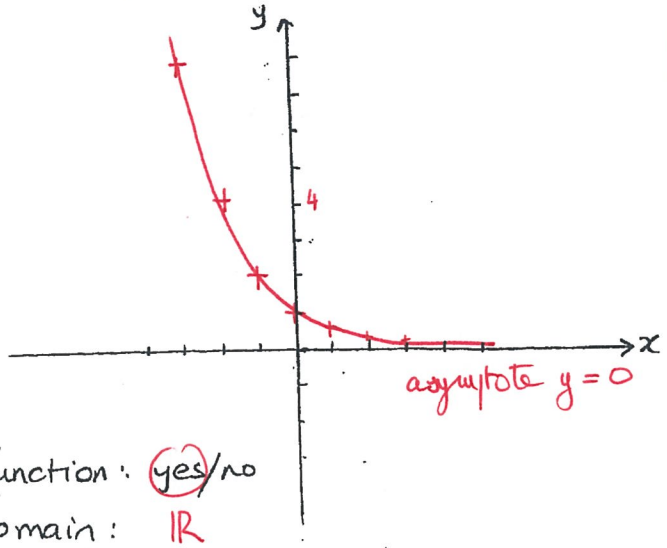
x	-3	-2	-1	0	1	2	3
y	0.125	0.25	0.5	1	2	4	8



Function: (yes)/no
Domain: $\mathbb{R}$
Range: $\mathbb{R}^+$

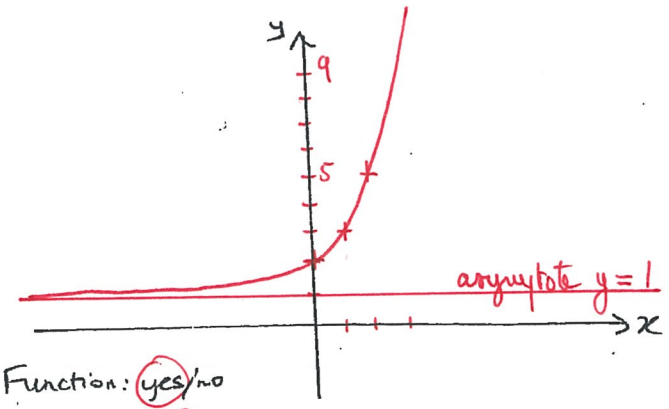
② $y = 2^{-x}$

x	-3	-2	-1	0	1	2	3
y	8	4	2	1	0.5	0.25	0.125



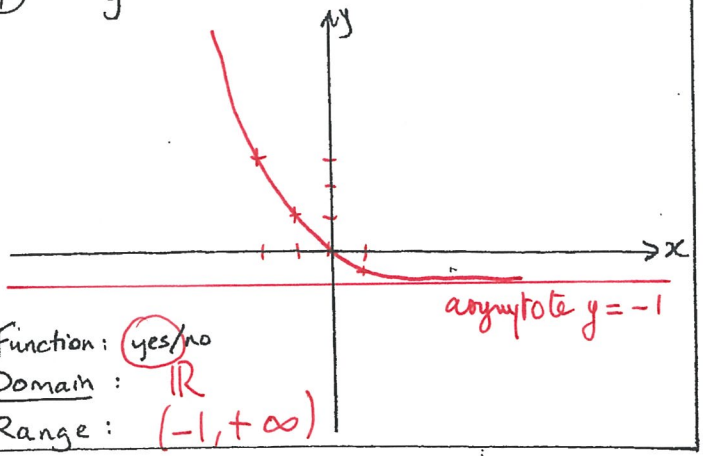
Function: (yes)/no
Domain: $\mathbb{R}$
Range: $\mathbb{R}^+$

③ $y = 2^x + 1$



Function: (yes)/no
Domain: $\mathbb{R}$
Range: $(1, +\infty)$

④ $y = 2^{-x} - 1$

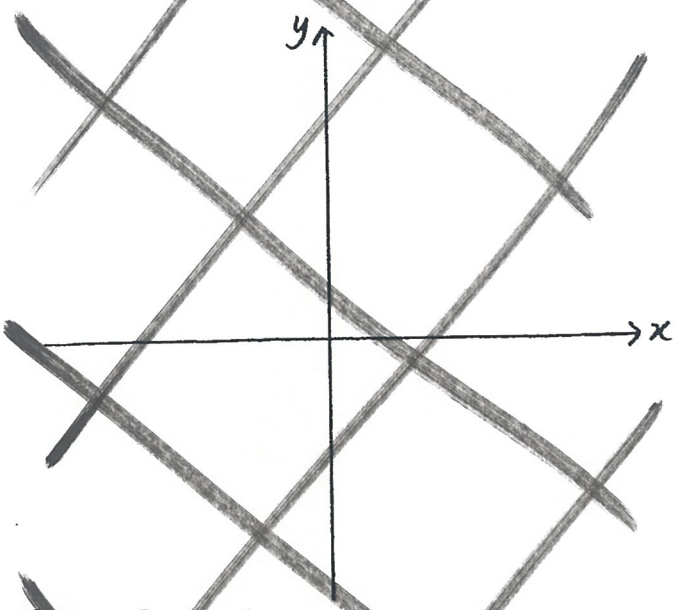


Function: (yes)/no
Domain: $\mathbb{R}$
Range: $(-1, +\infty)$

HYPERBOLAS - MORE!

Sketch:

① $y = \frac{1}{2x-1}$

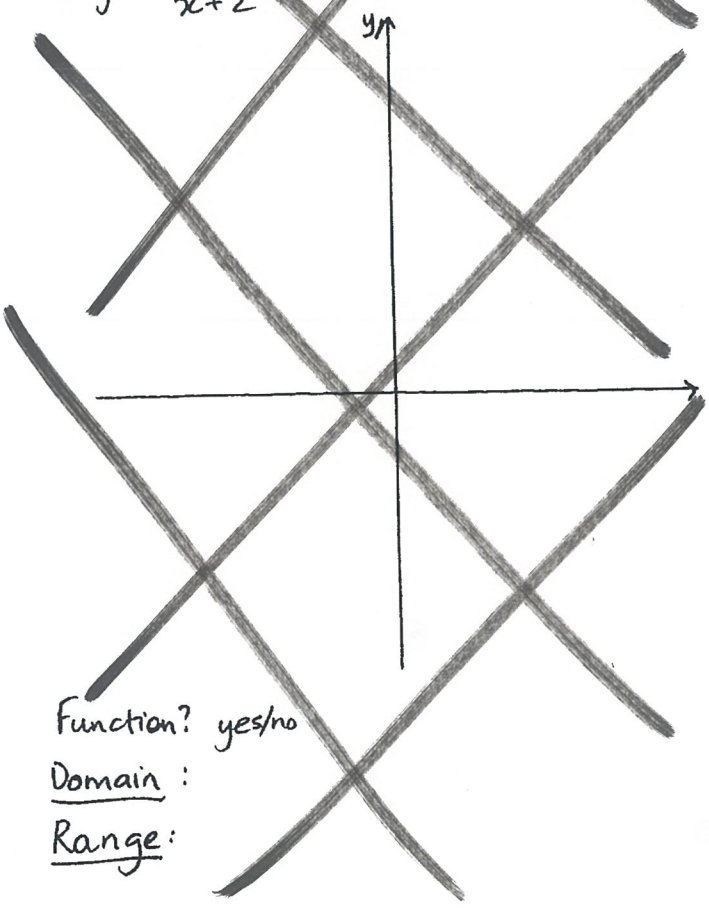


Function? yes/no

Domain:

Range:

② $y = \frac{2}{x+2} + 1$



Function? yes/no

Domain:

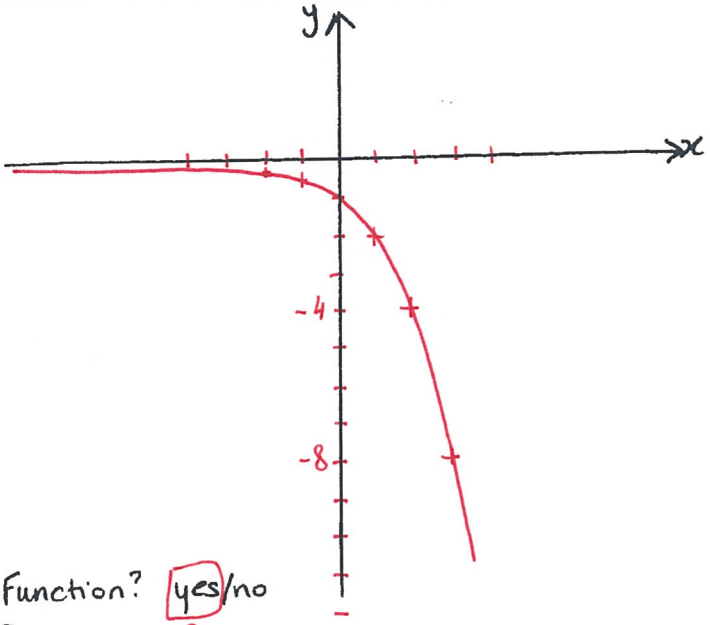
Range:

EXPONENTIALS - MORE!

Sketch

① $y = -2^x$

x	-4	-3	-2	-1	0	1	2	3	4
y	-0.06..	-0.125	-0.25	-0.5	-1	-2	-4	-8	-16



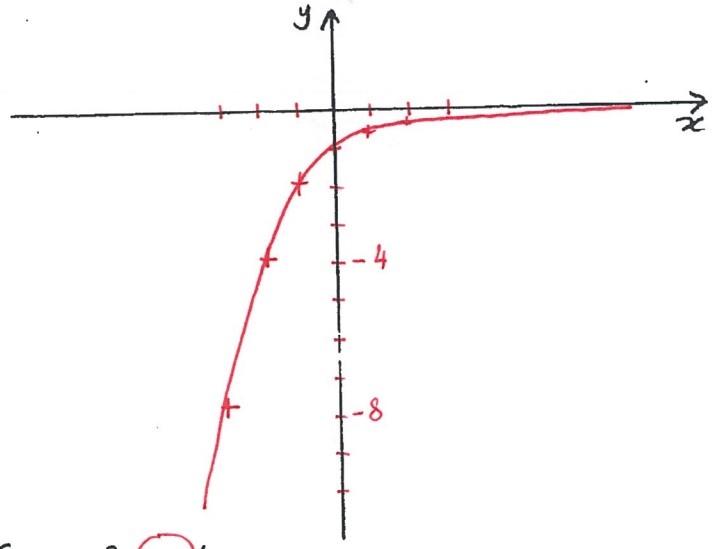
Function? (yes)/no

Domain: $\mathbb{R}$

Range: $\mathbb{R}^- - \{0\}$

② $y = -2^{-x}$

x	-4	-3	-2	-1	0	1	2	3	4
y	-16	-8	-4	-2	-1	-0.5	-0.25	-0.125	-0.06..



Function? (yes)/no

Domain: $\mathbb{R}$

Range: $\mathbb{R}^- - \{0\}$