3.2

#50 $f(x) = \dfrac{-3x-2}{x+4}$

a) $y = \dfrac{-3x-2}{x+4}$

$x = \dfrac{-3y-2}{y+4}$

$x(y+4) = -3y-2$

$xy + 4x = -3y - 2$

$xy + 3y = -4x - 2$

$(x+3)y = -4x - 2$

$y = \dfrac{-4x-2}{x+3} = f^{-1}(x)$

b) Domain of $f(x)$ = Range of $f^{-1}(x)$: $\mathbb{R} - \{-4\}$

& $f^{-1}(x)$ = & $f(x)$: $\mathbb{R} - \{-3\}$

3.2 Exponential fcns

$f(x) = b^x$ ← base

$b > 0, b \neq 1$

$f(x) = 2^x \quad \left(\frac{1}{2}\right)^{x+1} \quad 3^{-x} \quad (-2)^x$

Ex $f(x) = 2^x$

$f(-1) = 2^{-1} = \frac{1}{2}$

$f(3) = 2^3 = 8$

$f(\frac{5}{2}) = 2^{5/2}$

$= 2^2 \, 2^{1/2}$

$= 4\sqrt{2}$

$\sqrt{2^{5-1}}$

$2+2+1$

$2^4 2^1$

Graphing:

Procedure $y = b^{[x]} + d$

HA: $y = d$

x	y
x-1	
→ x=0	
x+1	
x+2	

Example

$f(x) = 3^x$

HA: $y = 0$

x	y
-1	$\frac{1}{3}$
→ 0	1
1	3
2	9

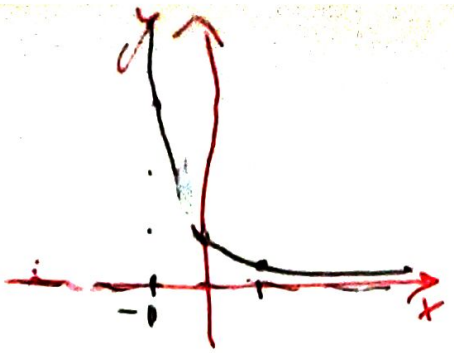
Domain: $\mathbb{R}$.

Range: $(0, \infty)$

Ex $f(x) = \left(\frac{1}{3}\right)^x = 3^{-x}$

HA: $y = 0$

x	y
-1	3
0	1
1	1/3



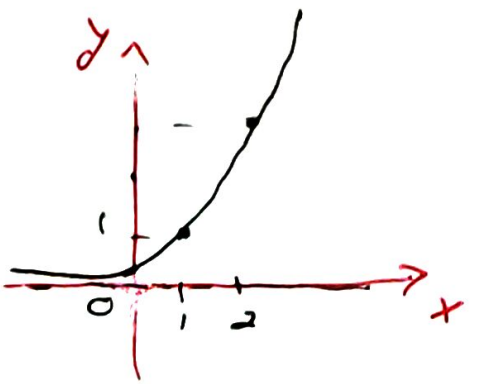
Domain: $\mathbb{R}$

Range: $(0, \infty)$

Ex $f(x) = 3^{x-1}$

HA: $y = 0$

x	y
0	1/3
1	1
2	3



Domain: $\mathbb{R}$

Range: $(0, \infty)$

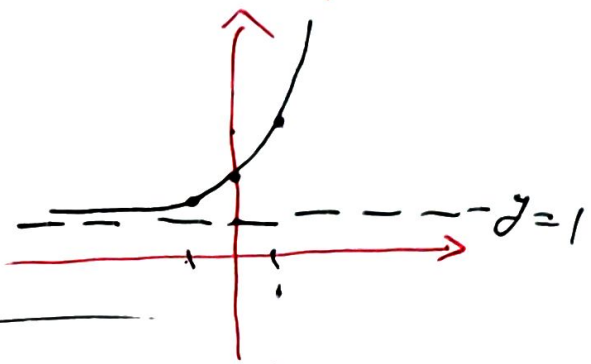
Ex: $f(x) = 2^x + 1$

HA: $y = 1$

Domain: $\mathbb{R}$

Range $(1, \infty)$

-1	3/2
0	2
1	3

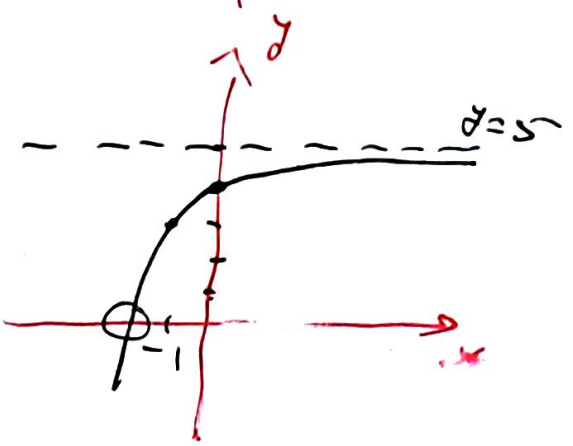


Ex $f(x) = 5 - 2^{-x}$

Asymptote: $y = 5$

Domain: $\mathbb{R}$

Range $(-\infty, 5]$

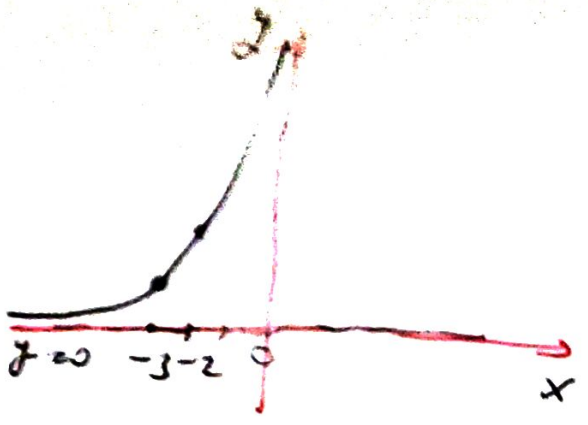


$f(x) = 2^{x+3}$

Asymptote: $y = 0$

Domain: $\mathbb{R}$

Range: $(0, \infty)$



Natural Base e

e^x = natural exponential function

$e \approx 2.7$

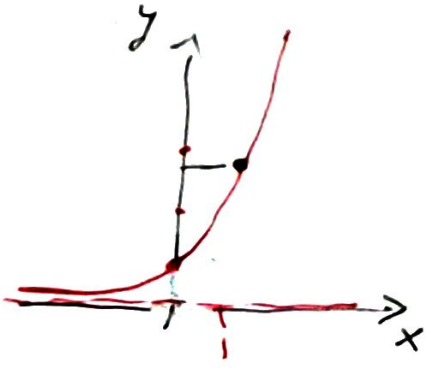
$e^0 = 1$

$f(x) = e^x$

Asymptote: $y = 0$

Domain: $\mathbb{R}$

Range: $(0, \infty)$



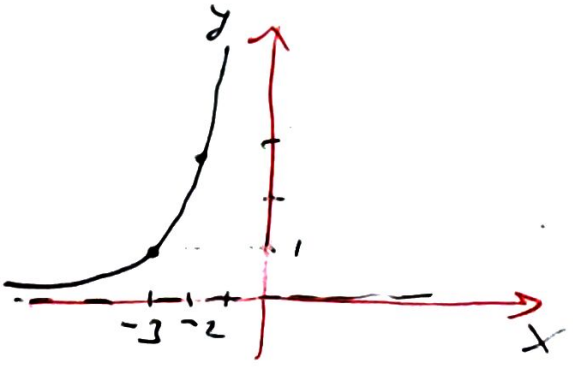
$e^{-1} = \frac{1}{e} \approx .3679$

$f(x) = e^{x+3}$

Asymptote: $y = 0$

Domain: $\mathbb{R}$

Range: $(0, \infty)$

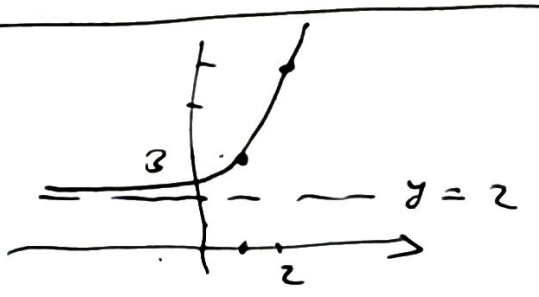


#14 $f(x) = -3 + 4^{x-1}$

Asymptote: $y = -3$ Domain $\mathbb{R}$ Range: $(-3, \infty)$

		Asymptote	Domain	Range
#14	$f(x) = 2 - 4^x$	$y = 2$	$\mathbb{R}$	$(-\infty, 2)$
#15	$f(x) = 3 - e^{x-2}$	$y = 3$	$\mathbb{R}$	$(-\infty, 3)$
#20	$f(x) = 2 + e^{x-1}$	$y = 2$	$\mathbb{R}$	$(2, \infty)$

20



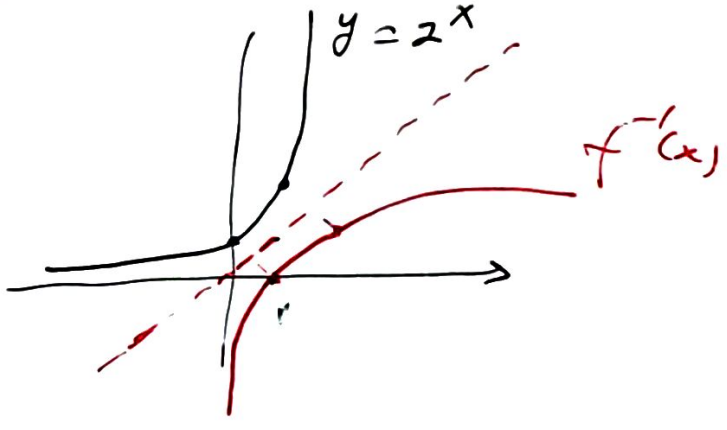
1	3
2	2+e

$y = 2^x$

$x = 2^y$

solve for y??

$f^{-1}(x) =$



$$x = b^y \iff y = \log_b x$$

$$b \neq 1, > 0$$

$\log = \log_{10}$

$\ln = \log_e$