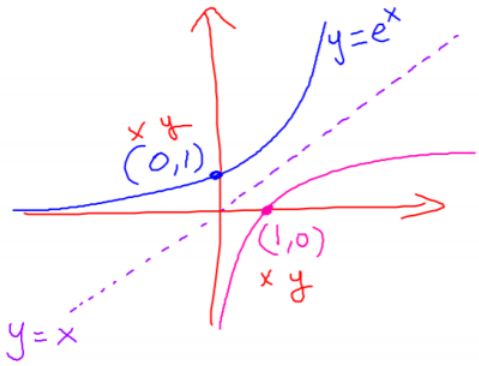
Section 1.5 Finding Inverse of functions.



e^x and $\ln x$ are symmetrical with respect to $y=x$.

	e^x	$\ln x$
D	$(-\infty,\infty)$	$(0,\infty)$
R	$(0,\infty)$	$(-\infty,\infty)$
Remarkable point	$(0,1)$ y-int	$(1,0)$ x-int.
Asymptotes	H.A	V.A

Ex 1: $f(x)=2x+1$ Find $f^{-1}(x)$

↑ inverse of $f(x)$

To find the inverse function:

1- Switch the variables (x and y)

2- Solve for y.

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

$y = 2x + 1$

$x = 2y + 1$

$-1 \qquad -1$

$\frac{x-1}{2} = \frac{2y}{2}$

$y = \frac{x-1}{2}$

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

Ex 2: $f(x) = \sqrt{x+2}$, find $f^{-1}(x)$

$y = \sqrt{x+2}$ Radical

$(x)^2 = (\sqrt{y+2})^2$ Solve for y

$x^2 = y + 2$

$y = x^2 - 2$

$\boxed{f^{-1}(x) = x^2 - 2}$ Quadratic

Ex 3: $f(x) = x^3$ cubic function

$y = x^3$

$\sqrt[3]{x} = \sqrt[3]{y^3}$

$y = \sqrt[3]{x}$

$\boxed{f^{-1}(x) = \sqrt[3]{x}}$ cube Root Function

Ex 4: $f(x) = \dfrac{x}{x+1}$

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

$$(y+1) \cdot x = \frac{y}{y+1} \cdot (y+1)$$

$$xy + x = y$$

$$-x \quad -x$$

$$xy = y - x$$

Group

$$-y \qquad -y$$

$$xy - y = -x$$

$$\frac{y(x-1)}{x-1} = \frac{-x}{x-1}$$

$$y = \frac{-x}{x-1}$$

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