FIGURE 0.1.

b) $D_f = D_u$ $\quad D_v = (-1, \infty)$ $\quad ((-\infty, 0) \cup (0, \infty) = (-1, 0) \cup (0, \infty)$.

$y = (1+x)^{1/x}$ $\qquad \ln y = \frac{1}{x} \ln(1+x)$ $\qquad \frac{y'}{y} = -\frac{1}{x^2} \ln(1+x) + \frac{1}{x}\frac{1}{1+x} = 0$
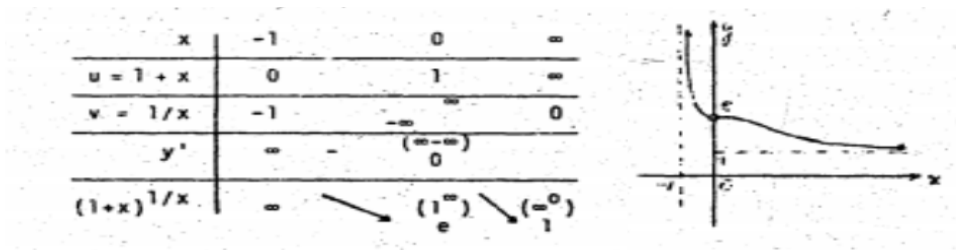
$\ln(1+x) = \frac{x}{1+x}$ $\qquad x = 0$.

FIGURE 0.2.

EXERCISES (6.1)

1. Simplify the following.
   a) e^0, $e^{\ln 1}$, $e^{\ln 2}$, $e^{-\ln 3}$, $e^{\ln x^2}$, $e^{-\ln x^2}$
   b) $\ln e^x$, $\ln e^{-2}$, $\ln exp\sqrt{x}$, $exp \ln \sqrt{x}$

2. Prove by induction:
   $p(n) : \ln a^n = n \ln a (a > 0)$, $n \in \mathbb{N}$.

3. Find the domains of definition of the following functions.

   a) $y = e^{\frac{x}{x+1}}$ $\qquad$ b) $e^{-\sqrt{\frac{x-2}{x+3}}}$ $\qquad$ c) $y = e^{\sqrt{\sin x}}$ $\qquad$ d) $y = e^{\tan x}$

4. Same question for:

   a) $y = \ln(1 + x^2)$ $\qquad$ b) $y = \ln \ln (x-1)$ $\qquad$ c) $\ln \ln \ln (x-1)$
   d) $y = \ln \arctan x$ $\qquad$ e) $y = \arctan \ln x$ $\qquad$ f) $y = \arcsin \ln x$

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