

(1) Find formulas for the inverse function of the following functions.

$$(a) \frac{1}{x+1}$$

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

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

$$(b) \frac{2x-3}{4-4x}$$

$$y = \frac{2x-3}{4-4x} \quad y(4-4x) = 2x-3 \quad 4y - 4xy = 2x-3$$

$$4y+3 = 2x+4xy \quad 4y+3 = x(2+4y) \quad x = \frac{4y+3}{2+4y}$$

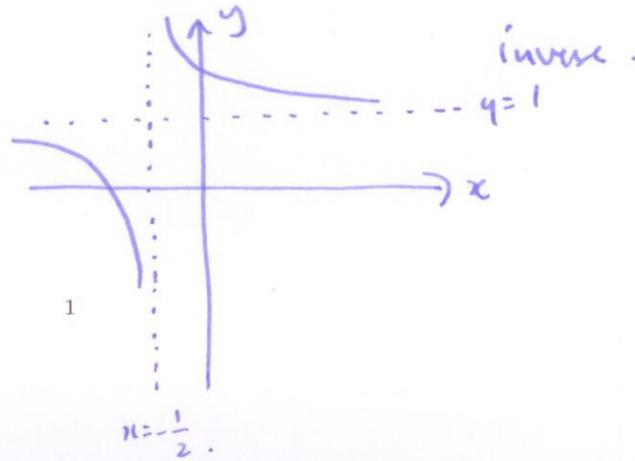
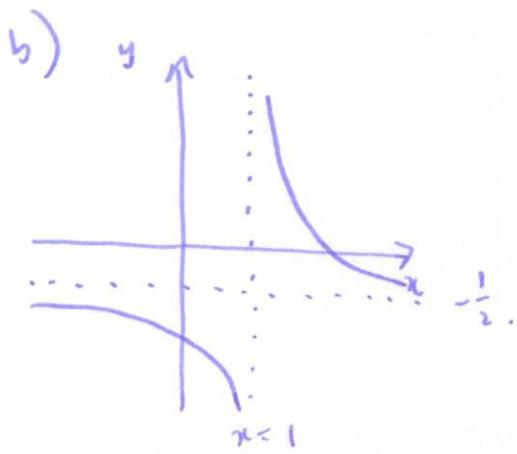
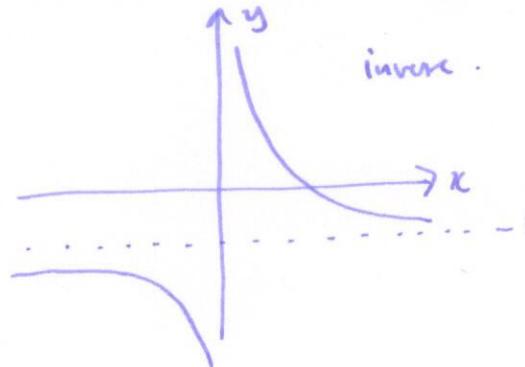
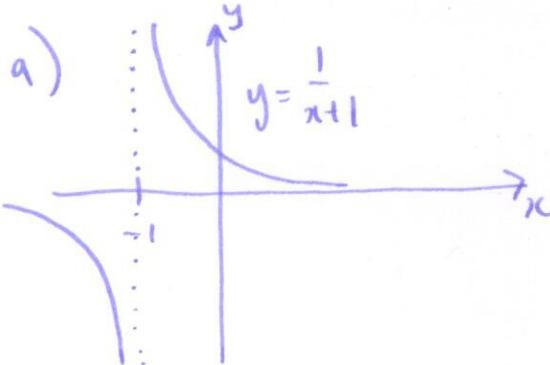
$$f^{-1}(x) = \frac{4x+3}{2+4x}$$

$$(c) \sqrt{2x-1}$$

$$y = \sqrt{2x-1} \quad y^2 = 2x-1 \quad y^2+1 = 2x \quad x = \frac{1}{2}(y^2+1)$$

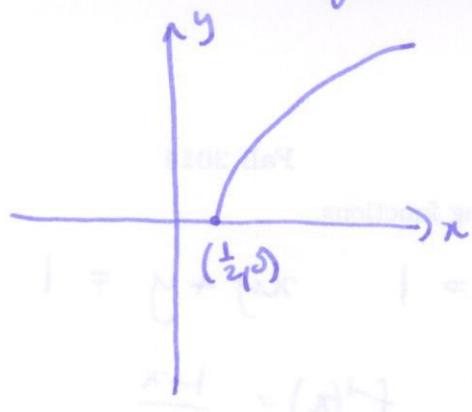
$$f^{-1}(x) = \frac{1}{2}(x^2+1)$$

(2) Sketch the graphs of the functions and their inverse functions.



c)

$$y = \sqrt{u-1}$$



$$1 = 0 + 1$$

$$\left(\frac{1}{2}, 0\right)$$

$$1 = (1+u)^{\frac{1}{2}}$$

$$\frac{1}{\sqrt{u}} = (u+1)^{-\frac{1}{2}} \quad u+1 = \frac{1}{\sqrt{u}} \quad u+1 = \mu$$

$$E_{\text{rest}} = pc^2 - \mu c \quad E_{\text{kin}} = (\mu c - \mu) c \quad \frac{E_{\text{rest}}}{\mu c - \mu} = \mu \quad \frac{E_{\text{kin}}}{\mu c - \mu} = m$$

$$\frac{E_{\text{rest}}}{E_{\text{kin}}} = \mu \quad (\mu c - \mu) \propto -E_{\text{kin}} \quad \mu c^2 + \mu^2 = E_{\text{kin}} \mu$$

$$\frac{E_{\text{rest}}}{E_{\text{kin}}} \approx (u)^{1-\frac{1}{2}}$$

\rightarrow $E_{\text{kin}} \propto u^{1-\frac{1}{2}}$

$$(1+\frac{1}{u})^{\frac{1}{2}} = u \quad u^2 = 1 + \frac{1}{u} \quad 1 - u^2 = \frac{1}{u} \quad \sqrt{1-u^2} = \mu$$

$$(1+\frac{1}{u})^{\frac{1}{2}} \approx (u)^{1-\frac{1}{2}}$$

andreas seines zeigt hier unmittelbar auf die werte von drücke (9)

