Section 3.7 (Cont)

Solve for the formula of the inverse function. $f^{-1}(x)$

Procedure for solving for the inverse function. $\boxed{y = f(x)}$ formula for the original function

(1) Solve for x (interms of y).

(2) Interchange x and y.

Eg. What is the inverse of the function $\boxed{f(x) = 2 - \sqrt{x}}$

$y = 2 - \sqrt{x}$

(1) Solve for x

$y - 2 = -\sqrt{x}$; $-y + 2 = \sqrt{x}$; Square both sides

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

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

$y^2 - 2y - 2y + 4 = x$

$y^2 - 4y + 4 = x$

$x = y^2 - 4y + 4$

(2) Interchange x and y. $\boxed{y} = x^2 - 4x + 4$.

$f^{-1}(x) = x^2 - 4x + 4$.

Eg. Find the inverse function of $\boxed{f(x) = \frac{2x+3}{5x+4}}$

$y = \frac{2x+3}{5x+4}$

Solve for x. (Goal)

$y(5x+4) = 2x+3$

$y(5x+4) - 3 = 2x$

$5xy + 4y - 3 = 2x$

$4y - 3 = 2x - 5xy$

$4y - 3 = x(2 - 5y)$

$x = \frac{4y-3}{2-5y}$; $\boxed{f^{-1}(x) = \frac{4x-3}{2-5x}}$

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