

inverse relationship between 2 functions

f and g

$$\text{if } f(a) = b$$

$$\text{then } g(b) = a$$

name for inverse of function f

is: $f^{-1}(x)$ "f-inverse of x "

How to find an inverse function

$y = f(x)$ a function.

To find the inverse,

① switch x and y

② solve for y

Ex: $y = 2x - 3$

$$x = 2y - 3$$

$$2y - 3 = x$$

$$2y = x + 3$$

$$y = \frac{1}{2}x + \frac{3}{2}$$

inverse,
slope-intercept
form

$$\text{Ex: } y = 3 - \sqrt{x+2}$$

$$x = 3 - \sqrt{y+2}$$

$$\sqrt{y+2} + x = 3$$

$$(\sqrt{y+2})^2 = (3-x)(3-x) \quad \swarrow (3-x)^2$$

$$y+2 = 9 - 6x + x^2$$

$$y = x^2 - 6x + 7$$

inverse
of original
f.c.n.

$$\#19 \quad \sqrt{3x+1} - \sqrt{x+1} = 2$$

$$(\sqrt{3x+1})^2 = (\sqrt{x+1} + 2)^2$$

square of sum $3x+1 = (\sqrt{x+1} + 2)(\sqrt{x+1} + 2)$

$$\boxed{(a+b)(a+b) = a^2 + 2ab + b^2}$$

$$\underline{3x+1} = \underline{x+1} + \underline{4\sqrt{x+1}} + \underline{4}$$

$$2x - 4 = 4\sqrt{x+1}$$

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

$$x^2 - 4x + 4 = 4(x+1)$$

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

$$x^2 - 8x = 0 \quad \cancel{x=0} \quad x=8$$

$$\#7 \quad y = \sqrt{x} - 2$$

$$x = \sqrt{y} - 2$$

$$\sqrt{y} - 2 = x$$

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

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

$$\#15 \quad y = -5\sqrt{x+2}$$

$$x = -5\sqrt{y+2}$$

$$(-5\sqrt{y+2})^2 = x^2$$

$$25(y+2) = x^2$$

$$y+2 = \frac{x^2}{25}$$

$$y = \frac{x^2}{25} - 2$$

Standard form: $y = \frac{1}{25}x^2 - 2$

$(y = ax^2 + bx + c)$