Finding the Rule of the Inverse of a Log Function

Given $y = 3\log_2 4(x-1)-6$ find the inverse.

What kind of function will the inverse be?
Exponential

$$x = 3\log_2 4(y-1)-6$$

$$x+6 = 3\log_2 4(y-1)$$

$$\frac{1}{3}(x+6) = \log_2 4(y-1)$$

$$\log_c p = q \iff c^q = p$$

$$2^{\frac{1}{3}(x+6)} = 4(y-1)$$

$$\frac{1}{4}(2)^{\frac{1}{3}(x+6)} = y-1$$

$$\boxed{f^{-1}(x) = \frac{1}{4}(2)^{\frac{1}{3}(x+6)} + 1}$$

Dom f =] 1, +∞[Dom f^{-1} = $\mathbb{R}$

Ran f = $\mathbb{R}$ Ran f^{-1} =]1, +∞[

∴ dom f = ran f^{-1}

ran f = dom f^{-1}

Finding the Rule of the Inverse of an Exponential Function

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

What kind of function will the inverse be?

Logarithmic

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

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

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

$$\overset{p}{2(x+1)} = \underset{c}{2}^{\overset{q}{\frac{1}{4}(y+3)}}$$

$$\log_c p = q \iff c^q = p$$

$$\log_2 2(x+1) = \frac{1}{4}(y+3)$$

$$4\log_2 2(x+1) = y + 3$$

$$f^{-1}(x) = 4\log_2 2(x+1) - 3$$

Dom f: R

Ran f:]-1,+∞[

Dom f^{-1}:]-1,+∞[

Ran f^{-1}: R

∴ dom f = ran f^{-1}

ran f = dom f^{-1}