Inverse Functions

f and g are inverses if $f(g(x)) = x$ and $g(f(x)) = x$

Find and verify the inverse: $y = 4x + 2$

1. Switch x and y
2. Solve for y.

$x = 4y + 2$

$-2 \quad -2$

$\frac{x-2}{4} = \frac{4y}{4}$

$\boxed{\frac{x}{4} - \frac{1}{2} = y}$

Verify: ↓ inverse of f(x)

Show that $f(f^{-1}(x)) = x$.

$y = 4x + 2$

$y = 4\left(\frac{x}{4} - \frac{1}{2}\right) + 2$

$= x - 2 + 2$

$= x$

Show that $f^{-1}(f(x)) = x$.

$y = \frac{x}{4} - \frac{1}{2}$

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

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

$x + \frac{1}{2} - \frac{1}{2} = x$

Find and verify the inverse: $y = -\frac{2}{3}x + 2$

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

$-2 \quad -2$

$-\frac{3}{2}(x-2) = -\frac{2}{3}y\left(-\frac{3}{2}\right)$

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

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

$y = -\frac{3}{2}\left(-\frac{2}{3}x + 2\right) + 3$

$= 1x - 3 + 3 = x$

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

$y = -\frac{2}{3}\left(-\frac{3}{2}x + 3\right) + 2$

$= 1x - 2 + 2$

$= x$