Inverses of Functions (cont.)

verify that $f(x) = 4x + 2$ and $f^{-1}(x) = \frac{1}{4}x - \frac{1}{2}$ are inverse functions.

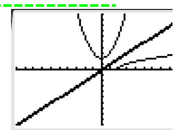
$$f(f^{-1}(x)) = 4\left(\frac{1}{4}x - \frac{1}{2}\right) + 2$$

$$x - 2 + 2 = x$$

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

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

Find and verify the inverse:



$f(x) = x^2 + 2$

$y = x^2 + 2$

$x = y^2 + 2$
$-2 \qquad -2$

$x - 2 = y^2$

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

$\sqrt{x-2} = y$

$f(f^{-1}(x)) =$

$x^2 + 2$

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

$x - 2 + 2 = x$

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

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

$= \sqrt{x^2 + 2 - 2}$

$= \sqrt{x^2} = x$

$f(x) = -x^3 + 4$

$y = -x^3 + 4$

$x = -y^3 + 4$
$-4 \qquad -4$

$x - 4 = -y^3$

$-x + 4 = y^3$

$\sqrt[3]{-x+4} = \sqrt[3]{y^3}$

$\sqrt[3]{-x+4} = y$

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

$= -(\sqrt[3]{-x+4})^3 + 4$

$= -(-x+4) + 4$

$= x - 4 + 4 = x$

$f^{-1}(f(x)) = \sqrt[3]{-x+4}$

$= \sqrt[3]{-(-x^3+4)+4}$

$= \sqrt[3]{x^3 - 4 + 4}$

$= \sqrt[3]{x^3} = x$

p. 443/ # 15 - 23, 25, 26, 29 - 34, 38, 39, 50, 61 ,62 - due Monday, Feb 10