Name: KEY

Section 2.5 – Inverse Functions

1. Find the inverse of the following functions and check your solutions by computing $f(f^{-1}(x))$ and $f^{-1}(f(x))$

$f(x) = 2x - 1$

$y = 2x - 1$

$x = 2y - 1$

$x + 1 = 2y$

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

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

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

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

$x + 1 - 1$

x ✓

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

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

$\frac{2x}{2} = x$ ✓

$g(x) = \sqrt{2x-1}$ D: $x \geq \frac{1}{2}$ R: $y \geq 0$

$g^{-1}(x)$: D: $x \geq 0$ $y \geq \frac{1}{2}$

$y = \sqrt{2x-1}$

$x = \sqrt{2y-1}$

$x^2 = 2y - 1$

$x^2 + 1 = y$

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

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

$g(g^{-1}(x)) \rightarrow \sqrt{2\left(\frac{x^2+1}{2}\right) - 1}$

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

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

but $x \geq 0$

$|x| = x$

$g^{-1}(g(x))$

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

x ✓

2. If $(-2, 3)$ *is on* $f(x)$

What point is on: $f^{-1}(x-2)+4$

$(-2,3) \rightarrow (3,-2)$ inverse

↓

$(3,2)$ vertical +4

↓

$(5,2)$ horizontal +2

3. If (a, b) *is on* $f(x)$

What point is on: $-f^{-1}(x+1)-2$

$(a,b) \rightarrow (b,a)$ inverse

$(b,-a)$ y reflection

$(b,-a-2)$ down 2

$(b-1,-a-2)$ left 1

Flip over $y=x$ or swap $(x,y) \rightarrow (y,x)$

4. Given the graphs below. Sketch the inverse graph on the same grid.