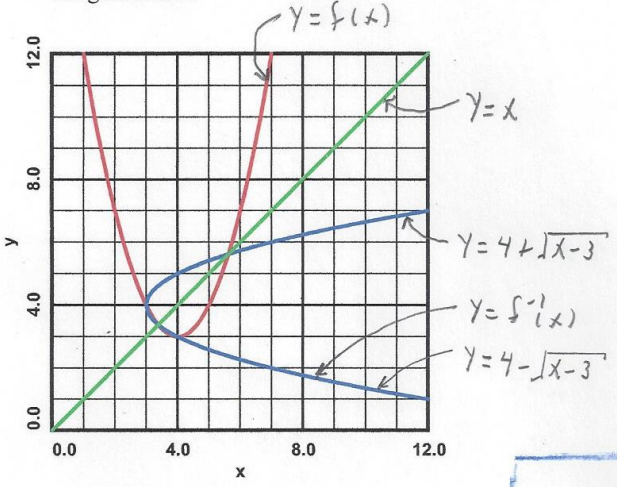
PRE–AP ALGEBRA 2

2B.2 CLASSWORK

1) For $y = f(x) = x^2 - 8x + 19$:

a) Calculate $y = f^{-1}(x)$

b) Graph $y = f(x)$, $y = f^{-1}(x)$ and $y = x$ on the grid below.



a) $y - 19 = x^2 - 8x$

$+16 \qquad +16$

$y - 3 = x^2 - 8x + 16 = (x-4)^2$

$y = f(x) = (x-4)^2 + 3$

Switch x & $y \Rightarrow$

$x = (y-4)^2 + 3$

$(y-4)^2 = x - 3$

$y - 4 = \pm\sqrt{x-3}$

$y = f^{-1}(x) = 4 \pm \sqrt{x-3}$ ◄

2) For $y = f(x)$ and $y = f^{-1}(x)$ from problem **1**, verify that $f(f^{-1}(x)) = x$.

$(f^{-1})^2 = (4 \pm \sqrt{x-3})^2 =$

$= 16 \pm 8\sqrt{x-3} + x - 3 =$

$= x + 13 \pm 8\sqrt{x-3}$

$f(f^{-1}) = (f^{-1})^2 - 8f^{-1} + 19 =$

$= (x + 13 \pm 8\sqrt{x-3}) - 8(4 \pm \sqrt{x-3}) + 19 =$

$= x + 13 \pm 8\sqrt{x-3} - 32 \mp 8\sqrt{x-3} + 19 =$

$= x + 13 - 32 + 19 = x$ ◄