Mathematician: _____ Date: _____ Hour: _____

Inverse Functions Extra Practice

For the given functions, determine the following:

a.) Is it 1-to-1?

b.) Does the domain need to be restricted? If so, state all restrictions.

c.) Find the inverse. If the domain was restricted, find all inverses and identify their domains.

1.) $f(x) = (x-2)^2 + 1$

a. NO

$x \geq 2$ or $x \leq 2$

$y = (x-2)^2 + 1$

$x = (y-2)^2 + 1$

$x - 1 = (y-2)^2$

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

$y = \sqrt{x-1} + 2$ $\quad x \geq 2$

$y = -\sqrt{x-1} + 2$ $\quad x \leq 2$

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

2.) $g(x) = 4x - 3$

Range: $\mathbb{R}$

a. yes

b. no

$y = 4x - 3$

$x = 4y - 3$

$3 + x = 4y$

$y = \frac{3+x}{4}$

3.) $m(x) = \sqrt{x} + 5$

$y = \sqrt{x} + 5$

$x = \sqrt{y} + 5$

$(x-5)^2 = (\sqrt{y})^2$

$(x-5)^2 = y$

$y = (x-5)^2$ D: $x \geq 5$

Range $y \geq 5$

4.) $r(x) = x^2 - 4$

$y \geq -4$

a. NO

b. $x \geq 0$ or $x \leq 0$

c.

$x = y^2 - 4$

$\sqrt{x+4} = \sqrt{y^2}$

$y = \pm\sqrt{x+4}$

$y = \sqrt{x+4}$ $\quad x \geq 0$

$y = -\sqrt{x+4}$ $\quad x \leq 0$

D: $x \geq -4$