

⑤ If $f(x) = \frac{1}{x+2}$ and $g(x) = \frac{1}{x} - 2$, is $g = f^{-1}$?

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

$$g = f^{-1} \text{ and } f = g^{-1}$$

⑥ Find the inverse of the function $f(x) = 2 + \sqrt{x-4}$.

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

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

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

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

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

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

⑦ Find a formula for the inverse function that gives Fahrenheit temperature as a function of Celsius temperature.

$$C = \frac{5}{9}(F - 32)$$

$$F = \frac{9}{5}C + 32$$

⑧ Find the domain and range of the following function

$$g(x) = 2\sqrt{x-4}$$

$$x-4 \geq 0$$

$$x \geq 4$$

$$\text{Domain } g(x): [4, +\infty)$$

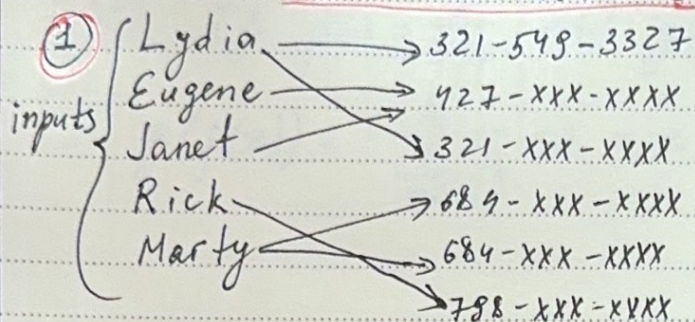
$$g(4) = 2\sqrt{4-4}$$

$$g(4) = 2 \cdot 0$$

$$g(4) = 0$$

$$\text{Range: } g \rightarrow [0, +\infty)$$

W1 - HW Problems



This relation is not a function. Both Lydia and Marty (inputs) have two (outputs) numbers each.

(2) Determine if each of the following equations are functions

a) $y = x^2 + 1$ let $x = 2$

$y = 2^2 + 1$

$y = 5$

This is a function, it has exactly one output.

b) $y^2 = x + 1$

$y^2 = 2 + 1$

$y^2 = 3$

$y = \sqrt{3}$

It can be either negative or positive, so it's not a function.

(3) Which functions are surjective (i.e. onto)?

Which functions are injective (i.e. one-to-one)?

1) $f: \mathbb{Z} \rightarrow \mathbb{Z}$ defined by $f(n) = 3n$

The range of the function is not equal to \mathbb{Z} , it's $3\mathbb{Z}$. So it's injective, every output has at most one input.

2) $g: \{1, 2, 3\} \rightarrow \{a, b, c\}$ defined by $g = \begin{pmatrix} 1 & 2 & 3 \\ c & a & a \end{pmatrix}$

g isn't surjective. There's no input (in the domain) for $g(x) = b$, which is in the codomain.

g isn't injective.