

Problem 1

Find the inverse of each function and state its domain

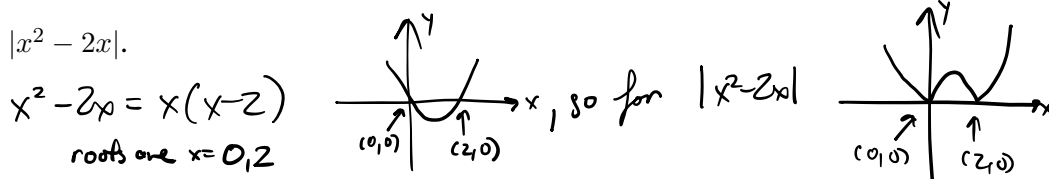
1. $f(x) = 1 + \sqrt{2+3x}$ 1) $x = 1 + \sqrt{2+3y}$, $\frac{(x-1)^2 - 2}{3} = y$, Domain: $[1, \infty)$

2. $g(x) = x^2 - x, x \geq \frac{1}{2}$ 2) $x = y^2 - y = (y - \frac{1}{2})^2 - \frac{1}{4}$, $\frac{1}{2} + \sqrt{x + \frac{1}{4}} = y$, Domain: $[-\frac{1}{4}, \infty)$

3. $h(x) = \log(x+3)$ 3) $x = \log(y+3)$, $e^x - 3 = y$, Domain: $(-\infty, \infty)$

Problem 2

Sketch the function $f(x) = |x^2 - 2x|$.



Problem 3

Find an expression for x in each of the following. (Hint: some of them may not have solutions)

1. $2^{x+2} = \frac{1}{4}$ $(x+2) \log 2 = \log(\frac{1}{4})$, $x = \frac{-\log(4)}{\log(2)} - 2 = \frac{-2\log(2)}{\log(2)} - 2 = -4$

2. $\frac{1}{2}^{2-x} = \frac{1}{16}$ $(2-x) \log(\frac{1}{2}) = \log(\frac{1}{16})$, $2-x = \frac{\log(16)}{\log(2)}$, $x = 2 - \frac{4\log(2)}{\log(2)} = -2$

3. $3^{x^2} = \frac{1}{27}$ $x^2 \log(3) = \log(\frac{1}{27})$, $x^2 = \frac{-3\log(3)}{\log(3)} = -3$, no solution.

Problem 4

Find the domain of $\log(2x^2 - 4x + 2)$. Sketch this function. (Hint: Sketch $\log(x^2)$ first. How can you transform $\log(x^2)$ to the function given?)

$$2x^2 - 4x + 2 = 2(x-1)^2$$

So shift $\log(x^2) = 2\log(x)$ by one unit to the right,
 and stretch horizontally by $\frac{1}{2}$.