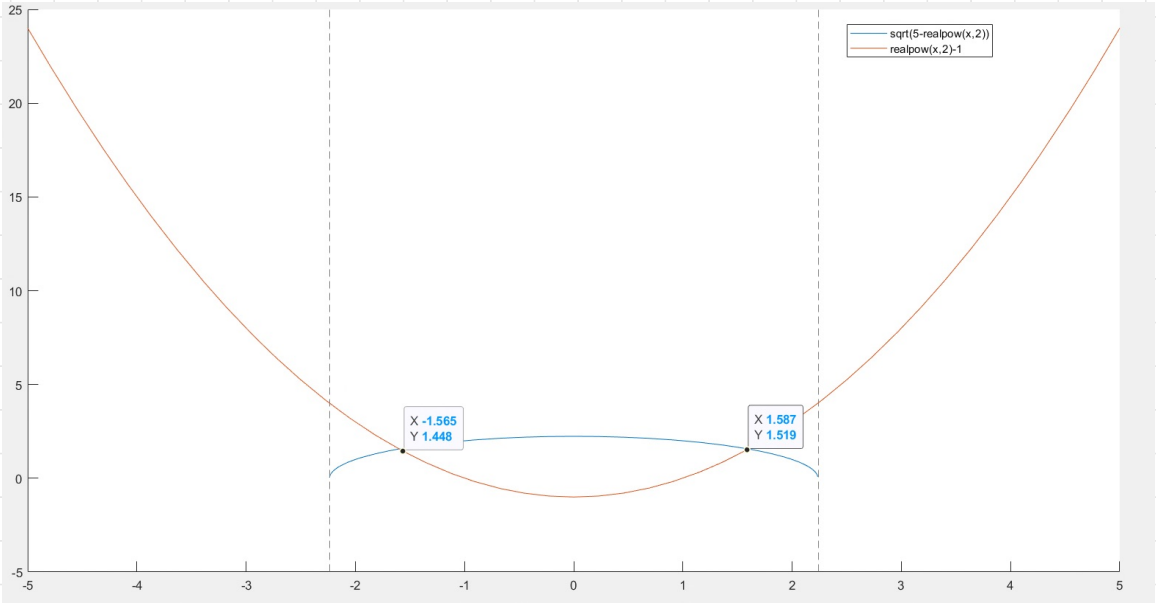
a) using MATLAB



b) $x^2 = 5 - y^2$

$y + 1 = x^2$

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

$y = x^2 - 1$

Iter 1:

$x = \sqrt{5 - (1.5)^2} = \sqrt{11/4} \approx 1,66$

$y = 11/4 - 1 = 7/4 = 1,75$

Iter 2:

$x = \sqrt{5 - (7/4)^2} = \sqrt{31/16} \approx 2,27$

$y = 31/16 - 1 = 15/16 = 0.9375$

Iter 3:

$x = \sqrt{5 - (15/16)^2} = \sqrt{\frac{1055}{256}} \approx 2.03$

$y = \frac{1055}{256} - 1 = \frac{799}{256} \approx 3.12$

c) $f_1(x,y) = x^2 + y^2 - 5$
$f_2(x,y) = y - x^2 + 1$

$\frac{\partial f_{1,0}}{\partial x} = 2x = 2(1.5) = 3$

$\frac{\partial f_{1,0}}{\partial y} = 2y = 2(1.5) = 3$

$\frac{\partial f_{2,0}}{\partial x} = -2x = -3$

$\frac{\partial f_{2,0}}{\partial y} = 1$

$[J] = \begin{bmatrix} 3 & 3 \\ -3 & 1 \end{bmatrix} \longrightarrow |J| = 3 + 9 = 12$

$f_{1,0} = (1.5)^2 + (1.5)^2 - 5 = -.5$
$f_{2,0} = (1.5) - (1.5)^2 + 1 = .25$

$x_1 = 1.5 + \frac{0.5(1) + .25(3)}{12} = \frac{22}{48}$

$y_1 = 1.5 - \left(\frac{0.25(3) - (-.5)(-3)}{12}\right) = \frac{25}{16}$

$x = \sim 1.6$
$y = \sim 1.56$