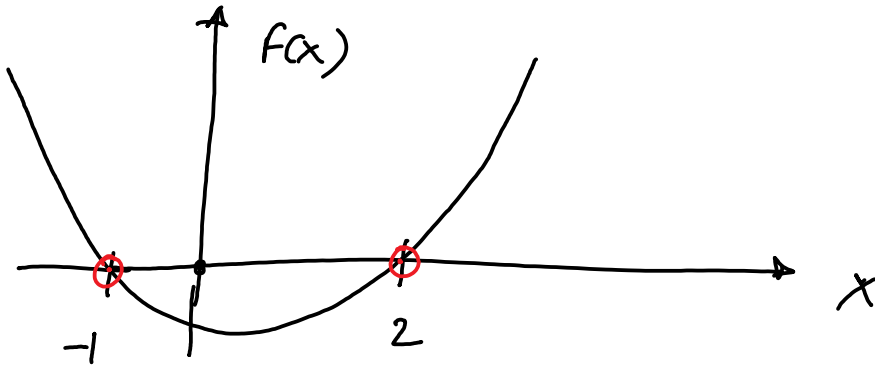


Root finding

$$f(x) = 0, \text{ find } x$$

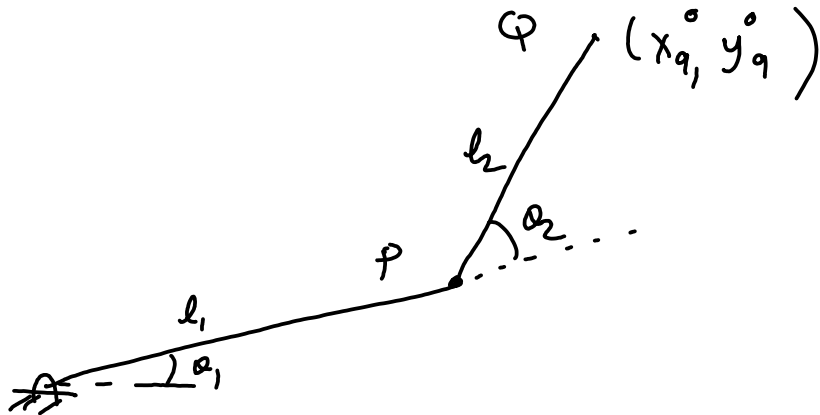
$$\text{Example: } \underline{f(x) = x^2 - x - 2}$$



Find the root using `fsolve`

[See MATLAB files for code and video for explanation](#)

Inverse kinematics



Given $q^o = (x_q^o, y_q^o)$, find θ_1 & θ_2

$$\begin{aligned} \checkmark x_q^o &= l_1 \overset{?}{\cos \theta_1} + l_2 \overset{?}{\cos(\theta_1 + \theta_2)} \\ \checkmark y_q^o &= l_1 \overset{?}{\sin \theta_1} + l_2 \overset{?}{\sin(\theta_1 + \theta_2)} \end{aligned}$$

We will solve for θ_1 & θ_2 using fsolve

$$\begin{cases} f_1(x_q^o, l_1, l_2, \theta_1, \theta_2) = x_q^o - l_1 \cos \theta_1 - l_2 \cos(\theta_1 + \theta_2) = 0 \\ f_2(y_q^o, l_1, l_2, \theta_1, \theta_2) = y_q^o - l_1 \sin \theta_1 - l_2 \sin(\theta_1 + \theta_2) = 0 \end{cases}$$

See MATLAB files for code and video for explanation