

Solution 23.1

	x	$f(x)$
x_{i-2}	0.261799388	0.965925826
x_{i-1}	0.523598776	0.866025404
x_i	0.785398163	0.707106781
x_{i+1}	1.047197551	0.5
x_{i+2}	1.308996939	0.258819045

$$\text{true} = -\sin(\pi/4) = -0.70710678$$

The results are summarized as

	first-order	second-order
Forward	$\square 0.79108963$ $\square 11.877\%$	$\square 0.72601275$ $\square 2.674\%$
Backward	$\square 0.60702442$ 14.154%	$\square 0.71974088$ $\square 1.787\%$
Centered	$\square 0.69905703$ 1.138%	$\square 0.70699696$ 0.016%