Solution 17.14

Linearization: Take the square root

$$\sqrt{y} = \frac{a + \sqrt{x}}{b\sqrt{x}}$$

or

$$\sqrt{y} = \frac{a}{b}\frac{1}{\sqrt{x}} + \frac{1}{b}$$

Therefore, a plot of $\sqrt{y}$ versus $1/\sqrt{x}$ should yield a straight line with a slope of a/b and an intercept of $1/b$.

x	y	$1/\sqrt{x}$	$\sqrt{y}$	$\sqrt{y}/\sqrt{x}$	$1/x$
0.5	10.4	1.414214	3.224903	4.560702	2
1	5.8	1	2.408319	2.408319	1
2	3.3	0.707107	1.81659	1.284523	0.5
3	2.4	0.57735	1.549193	0.894427	0.333333
4	2	0.5	1.414214	0.707107	0.25
		4.198671	**10.41322**	**9.855078**	**4.083333**

The slope and intercept can be computed as

$$a_1 = \frac{5(9.855078) - 4.198671(10.41322)}{5(4.083333) - 4.198671^2} = 1.992126$$

$$a_0 = \frac{10.41322}{5} - 1.992126\frac{4.198671}{5} = 0.409788$$

The constants can then be computed as

$$b = \frac{1}{0.409788} = 2.440288$$

$$a = 1.992126(2.440288) = 4.861362$$

and the prediction calculated as

$$y(1.6) = \left(\frac{4.861362 + \sqrt{1.6}}{2.440288\sqrt{1.6}}\right)^2 = 3.93904$$