Solution 17.12

The equation can be linearized by inverting it to yield

$$\frac{1}{k} = \frac{c_s}{k_{\max}} \frac{1}{c^2} + \frac{1}{k_{\max}}$$

Consequently, a plot of $1/k$ versus $1/c$ should yield a straight line with an intercept of $1/k_{\max}$ and a slope of $c_s/k_{\max}$

***c*, mg/L**	***k*, /d**	**$1/c^2$**	**$1/k$**	**$1/c^2 \times 1/k$**	**$(1/c^2)^2$**
0.5	1.1	4.000000	0.909091	3.636364	16.000000
0.8	2.4	1.562500	0.416667	0.651042	2.441406
1.5	5.3	0.444444	0.188679	0.083857	0.197531
2.5	7.6	0.160000	0.131579	0.021053	0.025600
4	8.9	0.062500	0.112360	0.007022	0.003906
	Sum →	**6.229444**	**1.758375**	**4.399338**	**18.66844**

The slope and the intercept can be computed as

$$a_1 = \frac{5(4.399338) - 6.229444(1.758375)}{5(18.66844) - (6.229444)^2} = 0.202489$$

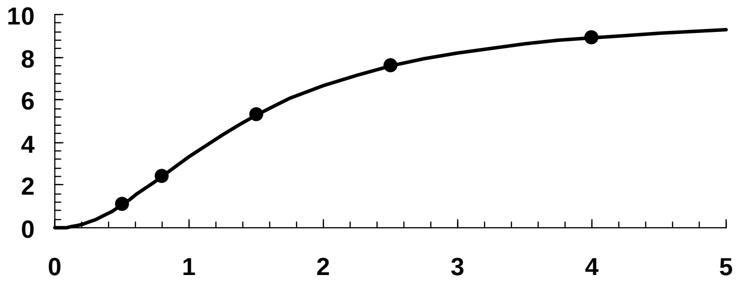
$$a_0 = \frac{1.758375}{5} - 0.202489 \frac{6.229444}{5} = 0.099396$$

Therefore, $k_{\max} = 1/0.099396 = 10.06074$ and $c_s = 10.06074(0.202489) = 2.037189$, and the fit is

$$k = \frac{10.06074 c^2}{2.037189 + c^2}$$

Solution continued on the next page...

This equation can be plotted together with the data:



The equation can be used to compute

$$k = \frac{10.06074(2)^2}{2.037189 + (2)^2} = 6.666$$