## Solution 17.12

The equation can be linearized by inverting it to yield

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

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

c, mg/L	<i>k</i> , /d	1/ <i>c</i> ²	1/ <i>k</i>	1/ <i>c</i> <sup>2</sup> ×1/ <i>k</i>	(1/c²)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	0.44444	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
	$Sum \rightarrow$	6.229444	1.758375	4.399338	18.66844

The slope and the intercept can be computed as

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

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

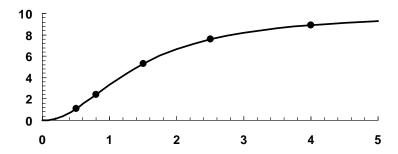
Therefore,  $k_{\text{max}} = 1/0.099396 = 10.06074$  and  $c_s = 10.06074(0.202489) = 2.037189$ , and the fit is

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

Solution continued on the next page...

Copyright © McGraw-Hill Education. This is proprietary material solely for authorized instructor use. Not authorized for sale or distribution in any manner. This document may not be copied, scanned, duplicated, forwarded, distributed, or posted on a website, in whole or part.

This equation can be plotted together with the data:



The equation can be used to compute

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