Biology 4605 / 7220 Name ______Key________

Quiz #2b 17 September 2003

1. The Monod equation describes the growth rate μ of bacteria (as a percentage) in relation to substrate concentration.

$$\mu = \mu_{max}\left(\frac{S}{S + K_S}\right)$$

$$\mu = \frac{1}{S}\frac{dS}{dt} = \%\ hour^{-1}$$

S = *substrate concentration (mg / liter)*

K_S = *half saturation constant (mg / liter)*

μ_{max} = *maximum rate of bacteria growth*

μ_{max} *has units of % per hour*

Fill in the dimensions	M	L	T
μ	0	0	-1
μ_{max}	0	0	-1
S	1	-3	0
K_s	1	-3	0

Write a data equation for an observed value of μ = 0.95/hour (95% per hour), given
S = 20 mg/liter
K_S = 2 mg/liter
μ_{max} = 1/hour (100% per hour)

$0.95hr^{-1}$	=	$0.909hr^{-1}$	+	$0.041hr^{-1}$
Observed	=	Model value	+	Residual

2. Convert 15 kilometres travelled in 2 hours to speed in metre/second.

$$\frac{15km}{2hr}\cdot\frac{1000m}{km}\cdot\frac{1hr}{60min}\cdot\frac{1min}{60sec} = 2.083\frac{m}{sec}$$

3. Complete the following computation.

$(15\ m)^{1.4}$ = ______$44.3\ m^{1.4}$______________