CONCEPT: CONCEPT: LINEWEAVER BURK PLOT

Lineweaver-Burk Equation

●Michaelis-Menten Equation can be *inverted* & *rearranged* to obtain the Lineweaver-______ equation: $\frac{1}{V_0} = \frac{K_m}{V_{max}}\left(\frac{1}{[S]}\right) + \frac{1}{V_{max}}$

□ The Lineweaver-Burk equation resembles the equation of a ________: y = mx + b.

Michaelis-Menten Equation:

$$V_0 = \frac{V_{max}[S]}{K_m + [S]}$$

Lineweaver-Burk Equation:

$$\frac{\quad}{V_0} = \frac{\_\_\_ + [\quad]}{\_\_\_\_[\quad]}$$

$$\frac{1}{V_0} = \frac{K_m}{V_{max}[S]} + \frac{[S]}{V_{max}[S]}$$

$$\frac{1}{V_0} = \frac{K_m}{V_{max}}\left(\frac{1}{[S]}\right) + \frac{1}{V_{max}}$$

Equation of a Line: $y = mX + b$

Lineweaver-Burk Equation: $\frac{1}{V_0} = \_\_\_\_\left(\frac{1}{[\quad]}\right) + \frac{1}{\_\_\_\_}$

Lineweaver-Burk Plot

●Values for V_{max} and K_m can be obtained from a *straight-line* on a ________ reciprocal plot or a ____________-Burk plot.

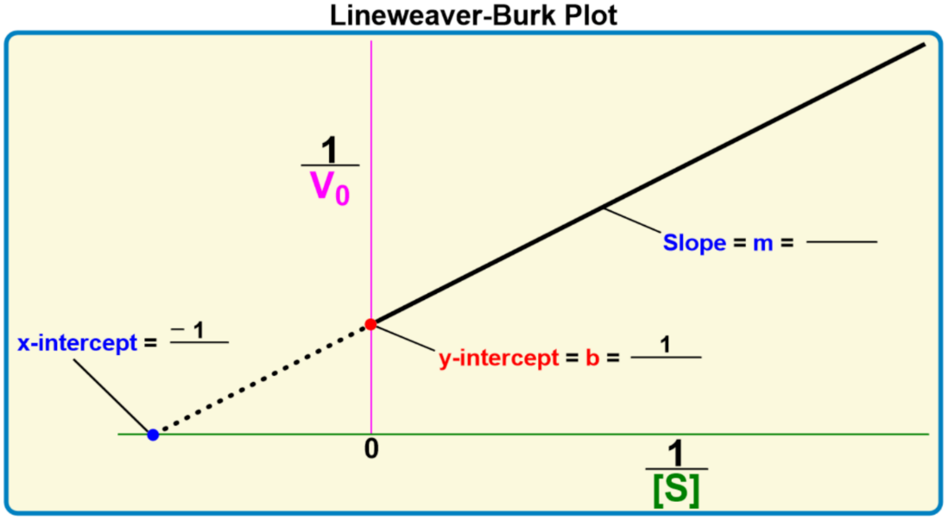
□ ____________ of V_0 ($1/V_0$) and [S] (1/[S]) are plotted into a linear plot.

□ _______ of the line is the _______ of K_m over V_{max} (K_m/V_{max}).

Lineweaver-Burk Equation:

$$\frac{1}{V_0} = \frac{K_m}{V_{max}}\left(\frac{1}{[S]}\right) + \frac{1}{V_{max}}$$

Lineweaver-Burk Plot



PRACTICE: A Lineweaver-Burk plot is used to:

a) Determine the equilibrium constant for an enzymatic reaction.

b) Illustrate the effect of temperature on an enzymatic reaction.

c) Extrapolate the reaction rate at any [E].

d) Solve, graphically, for reaction rate at any [S].

Y & X-Intercepts of a Lineweaver-Burk Plot

●The most important data on a Lineweaver-Burk plot are the ______________ of the line.

□ Y-intercept = the ______________ of V_{max} ($1/V_{max}$) when x = 0.

□ X-intercept = the ______________ *reciprocal* of K_m ($-1/K_m$) when y = 0.

CONCEPT: LINEWEAVER BURK PLOT

PRACTICE: To determine the V_{max} from a Lineweaver-Burk plot you would:

a) Multiply the reciprocal of the x-axis intercept by -1.

b) Multiply the reciprocal of the y-axis intercept by -1.

c) Take the reciprocal of the x-axis intercept.

d) Take the reciprocal of the y-axis intercept.

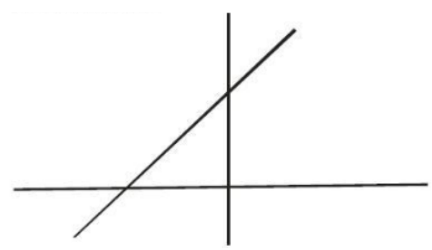
PRACTICE: A Lineweaver-Burk plot generates a line with the following formula: $y = 0.3x + 0.4$. What is the K_m?

a) 0.3 b) 0.4 c) 0.75 d) 2.5

PRACTICE: Consider the equation for the line on the following Lineweaver-Burk plot: $y = 6x + 3$

A) What is the K_m for the corresponding enzyme?

a) -2 mM b) 18 mM c) 2 mM d) 9 mM



B) What is the V_{max} for the corresponding enzyme?

a) 0.333 mM/s b) 9 mM/s c) -6 mM/s d) 18 mM/s

PRACTICE: Consider the following enzyme-catalyzed reaction A → B and suppose the enzyme kinetic data for this reaction (shown in the chart below) is inverted and plotted onto a Lineweaver-Burk plot to obtain a straight line.

A) What is the value of the y-intercept of the line? ____________

[A], µM	V_0, µmoles/min
0.0875	0.18
0.175	0.36
0.875	1.7775
1.75	3.6
8.75	16.425
17.5	29.25
87.5	90
175	119.25
8750	177.75
17500	180
35000	180

B) What is the value of the x-intercept of the line? ____________