CONCEPT: SHIFTING LINEWEAVER-BURK PLOTS

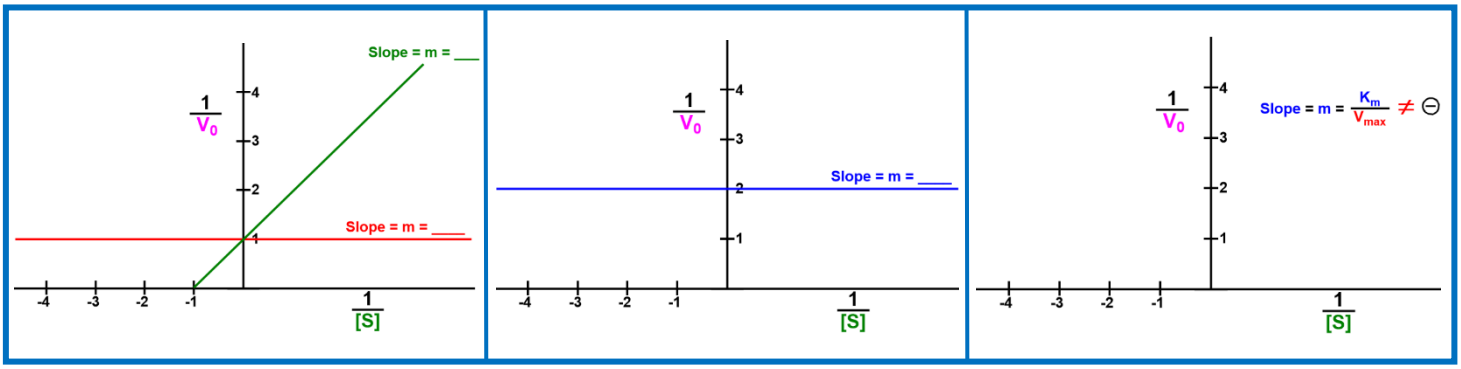
$y = mX + b$ | $\frac{1}{V_0} = \frac{K_m}{V_{max}}\left(\frac{1}{[S]}\right) + \frac{1}{V_{max}}$

●Recall: the Lineweaver-Burk equation resembles the equation of a line:

□ Slope (**m**): when **m** = 0, the line is _____ and increasing the slope (**m**) makes the line _____.

□ y-intercept (**b**): Increasing **b** will _____ the position where the line intersects the y-axis.

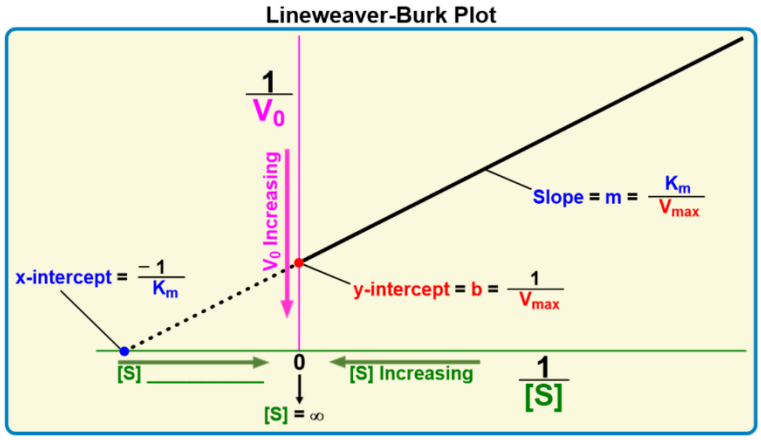
●The slope of a line on a Lineweaver-Burk Plot ($\frac{\Delta y}{\Delta x}$ or $\frac{\Delta \frac{1}{V_0}}{\Delta \frac{1}{[S]}}$) *cannot* be _____ or have a _____ value.



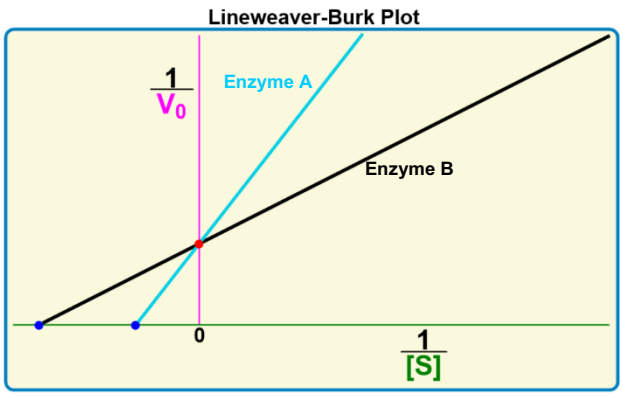
Visualizing Increases/Decreases to K_m & V_{max}

●Because x & y-axis in Lineweaver-Burk plots are _____ (1/[S] and $1/V_0$), the [S] and V_0 *increase towards zero*.

□ Note: y-intercept ($b = \frac{1}{V_{max}}$) occurs graphically at _____ (∞) [S].

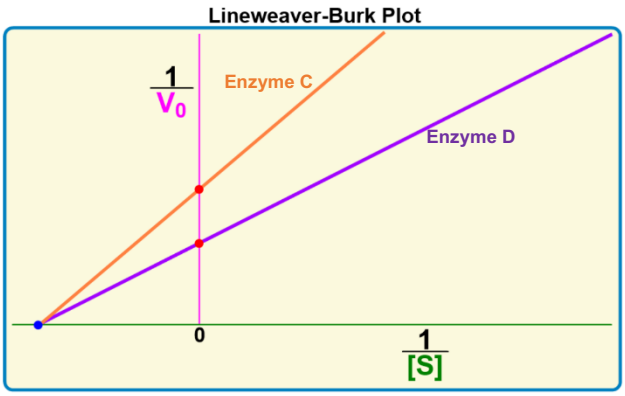


EXAMPLE: Indicate which enzyme in each graph below has a greater K_m & V_{max}.



K_m of Enzyme A is ____ K_m of **Enzyme B.**

V_{max} of Enzyme A is ____ V_{max} of **Enzyme B.**



K_m of Enzyme C is ____ K_m of Enzyme D.

V_{max} of Enzyme C is ____ V_{max} of Enzyme D.

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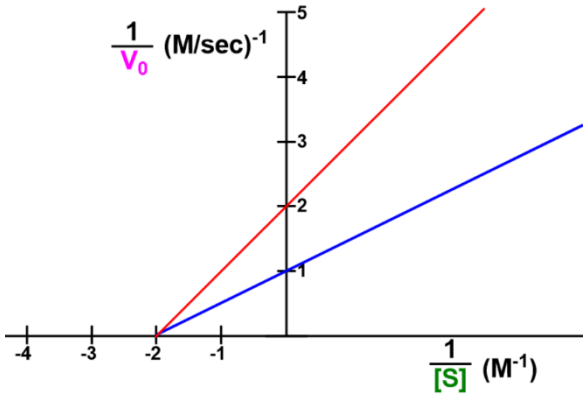
PRACTICE: Use the plot to the right. The K_m of both enzymes for their substrate is:

a) 4 M

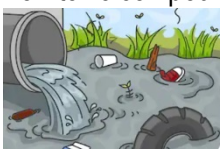
b) 2 M

c) 1 M

d) 0.5 M



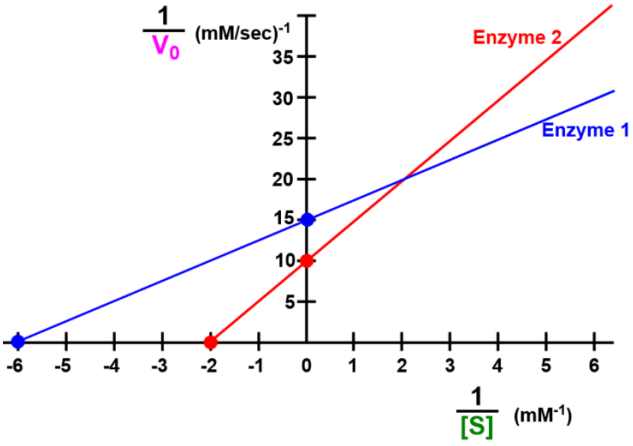
PRACTICE: Suppose a company develops two enzymes that degrade highly toxic compounds to non-toxic compounds. Your task is to degrade the greatest amount of toxic compound in the shortest amount of time.



A) Which enzyme is better to use when [S] = 0.167 mM? _____

B) Which enzyme is better to use at saturating [S]? _____

Enzyme	K_m	V_{max}
1	167 μM	66.7 μM/sec
2	500 μM	100 μM/sec



PRACTICE: Considering the Lineweaver-Burk plot below, which of the following enzymes would be better to use (converts more substrate to product) when the [S] = 0.001 M?

a) Enzyme A.

b) Enzyme B.