Session 12
10/13/25

1. what are the advantages and disadvantages of the Michaelis menten equation/graph?

advantages:
- easier to read

disadvantages:
- lacks consistency in estimating Vmax & Km
- difficult to see inhibition type

2. bigger Km = lower affinity

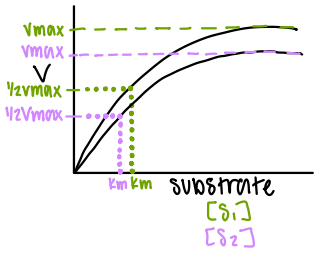
3. what are the advantages and disadvantages of Lineweaver Burke?

advantages:
- ability to get the value of Vmax & Km consistently
- easier to see the types of inhibition

disadvantages:
- must solve for Km and vmax

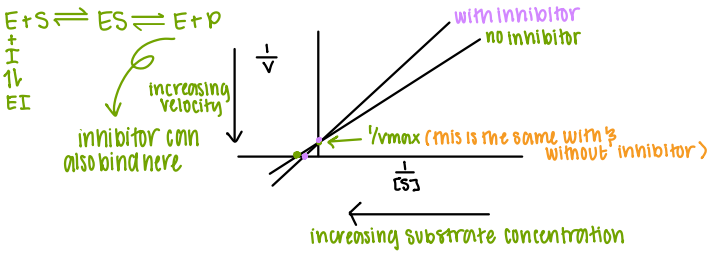
4. what is the purpose of both LWB and MM?
to visualize consistent comparison of enzymes on one graph.

5. what kind of curve is seen when using the MM equation? Draw this graph & label appropriately.
- hyperbolic curve



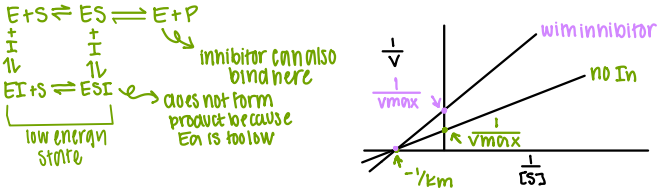
6. Define competetive innibition and draw the reaction. give both the written chemical equation and associated graph.

competetive inhibitors: one inhibitor competing with substrate in order to bind at the active site.



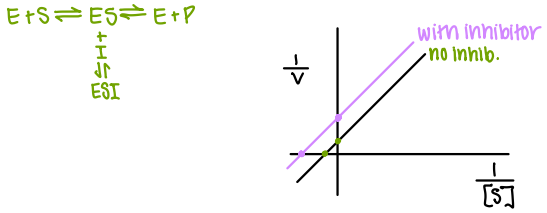
7. Define noncompetetive innibition and draw the reaction. give both the written chemical equation and associated graph.

noncompetetive: innibitor can bind to E or ES on active site or another site (innibitory site)



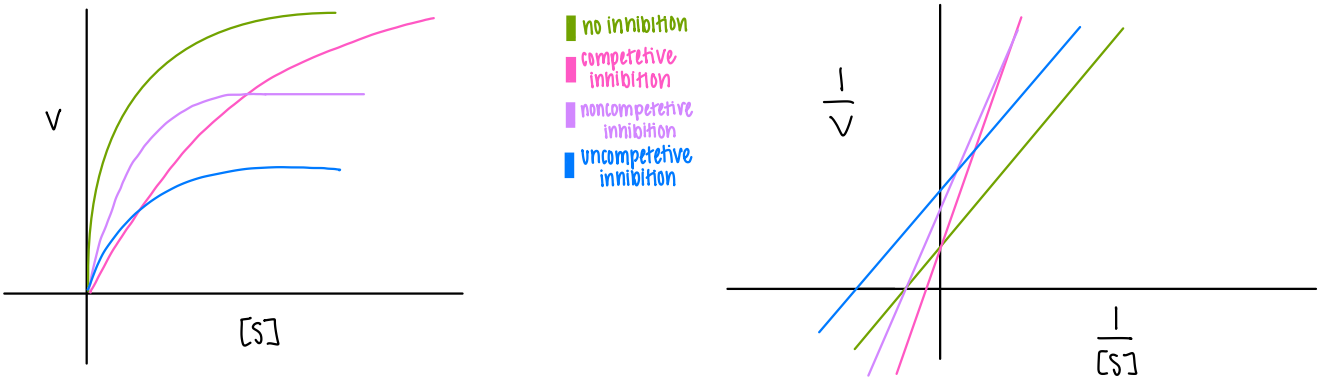
8. Define uncompetetive innibition and draw the reaction. give both the written chemical equation and associated graph.

uncompetetive: conformational change allows for a new site to form in the ES complex



9. Draw the 3 graphs of competetive, uncompetetive, and noncompetitive for both LWB & MM

michaelis-menten



10. Assume you have a LWB plot and determine the x-intercept is approximately 4.
- what is the corresponding Km value?

*there would not be a corresponding Km value!!
↓
Km can NOT be negative. This x-intercept on a LWB would not occur!!

11. Assume you have a LWB plot and determine the x-intercept is approximately -6
- what is the corresponding Km value?

$-1/Km = x\text{-intercept}$
$-1/Km = -6$
$Km = 0.167$

12. consider the following data for an enzyme-catalyzed hydrolysis reaction in the presence and absence of inhibitor I

[substrate] [M]		Vo [umol/min]	Voi (umol/min)
6×10^{-6}	.000006	20.8	4.2
1×10^{-5}	.00001	29	5.8
2×10^{-5}	.00002	45	9
6×10^{-5}	.00006	67.6	13.6
1.8×10^{-4}	.00018	87	16.2

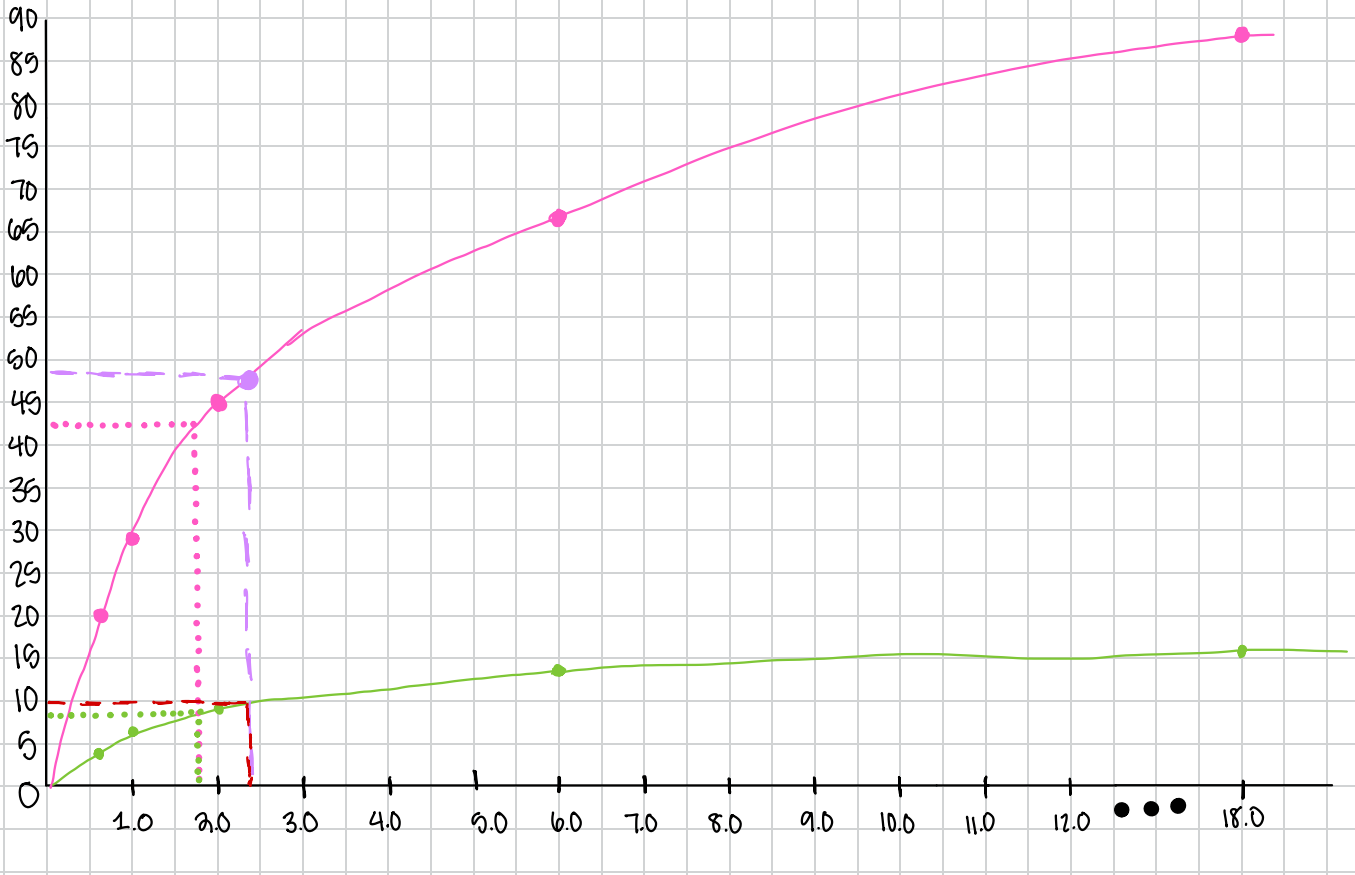
Using the MM plot, determine Km for the uninhibited and inhibited reaction

.000006
.000010
.000020
.000060
.0001800

Using the data above,

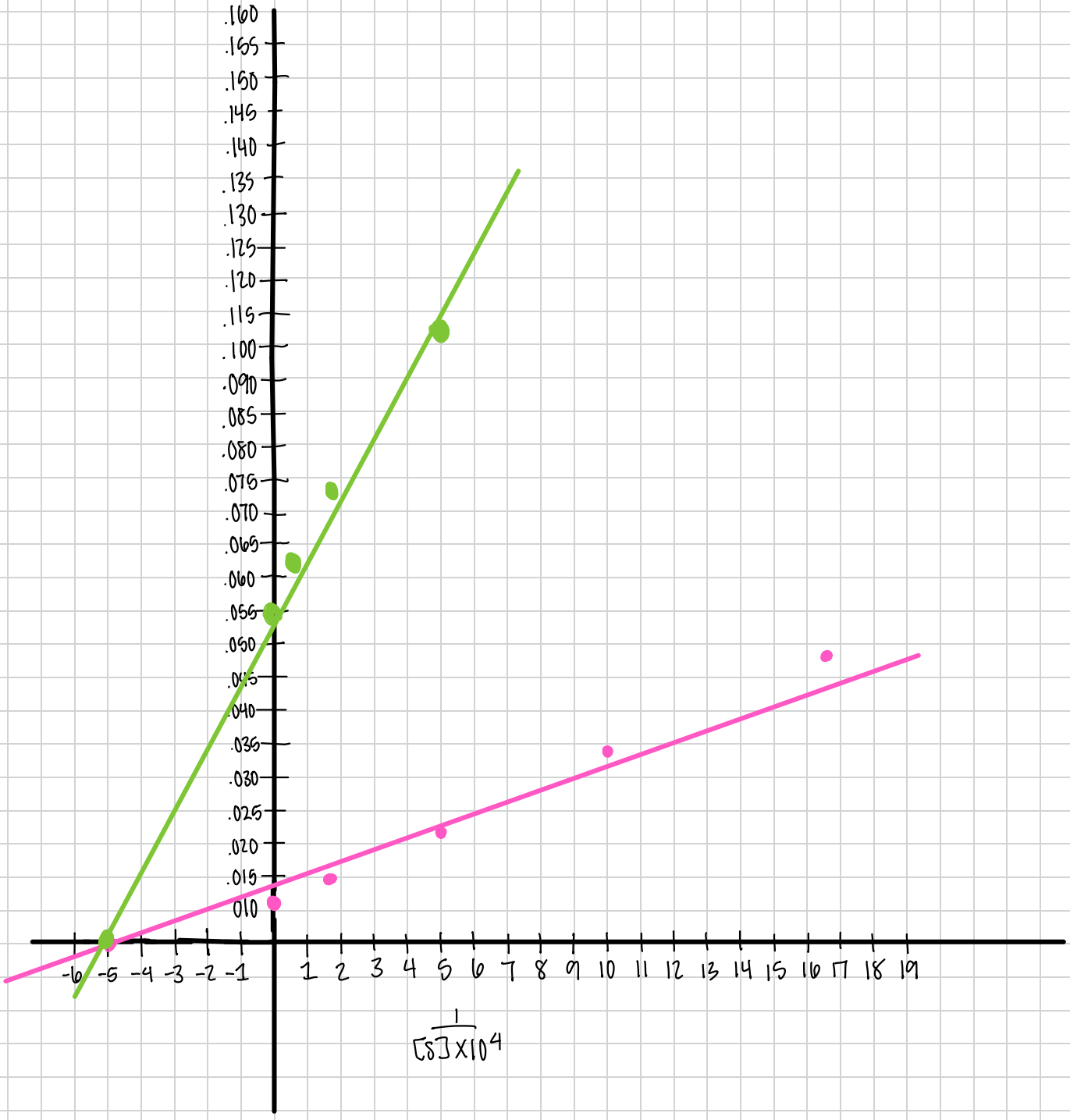
a. generate lineweaver-Burk plots

b. explain the significance of the horizontal intercept, the vertical intercept, and the slope



(no inhibitor)
$K_m = 2.4 \times 10^{-5}$ M

(inhibitor)
$K_m = 2.4 \times 10^{-5}$ M



[substrate] [M]	Vo [umol/min]	Vo [µmol/min]
1/6x10-6 = 16.7x10^4	1/20.8 = .048	1/4.2 = .248 X
1/1x10-5 = 10.0x10^4	1/29 = .034	1/5.8 = .172 X
1/2x10-5 = 6.0x10^4	1/45 = .022	1/9 = .111
1/6x10-5 = 1.7x10^4	1/67.6 = .015	1/13.6 = .074
1/1.8x10-4 = .56x10^4	1/87 = .011	1/16.2 = .062
	1/90 = .010	1/18 = .055