$$E + S \rightleftarrows E \cdot S \overset{k_{cat}}{\rightarrow} E + P$$

$$V = k_{cat}[E]_T \frac{[S]}{K_M + [S]} = k_{cat}[E]_T \frac{1}{1 + K_M/[S]}$$

1. What will V be for $[S] = 0$?

$V = k_{cat}[E]_T \cdot \frac{0}{K_M + 0} = \emptyset$ NO SUBSTRATE, NO RATE!

2. What will V be for $[S] \gg K_M$?

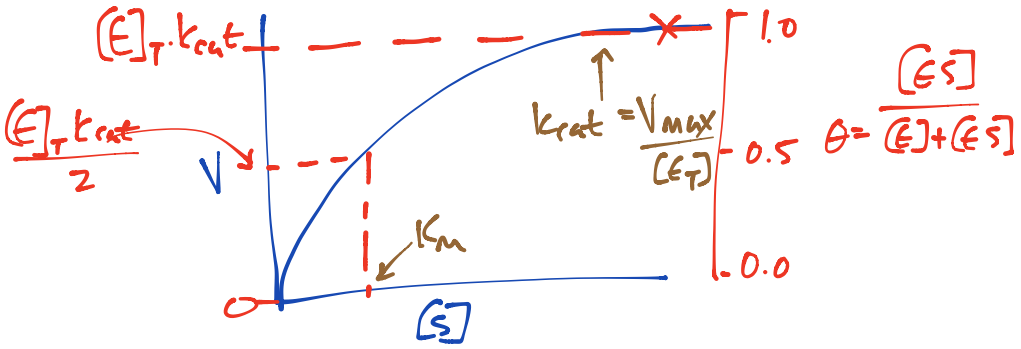
$V = k_{cat}[E]_T \cdot \frac{BIG}{K_M + BIG} \sim k_{cat}[E]_T \left(\frac{BIG}{BIG}\right) = k_{cat}[E]_t$

FOR A TON OF SUBSTRATE, ALL ENZYMES LOADED UP. ADDING SUBSTRATE HAS NO EFFECT.

3. What will V be for $[S] = K_M$?

$V = k_{cat}[E]_T \cdot \frac{K_M}{K_M + K_M} = k_{cat}[E]_T \frac{1}{2}$ WHEN 1/2 OF ENZYME SATURATED, RATE IS HALF OF MAX

4. In the space below, sketch your best guess for the shape of a V vs $[S]$. Put $[S]$ on the x-axis, V on the y-axis.



5. Can you find and label K_M and k_{cat} on your curve?

SEE BROWN