

1. Define the initial rate in terms of concentrations of  $V_{max}$ ,  $[S]_0$ , and  $K_M$ .

a.  $\frac{d[P]}{dt} =$

b.  $\frac{d[ES]}{dt} =$

c. Use the steady-state approximation to solve for  $[ES]$

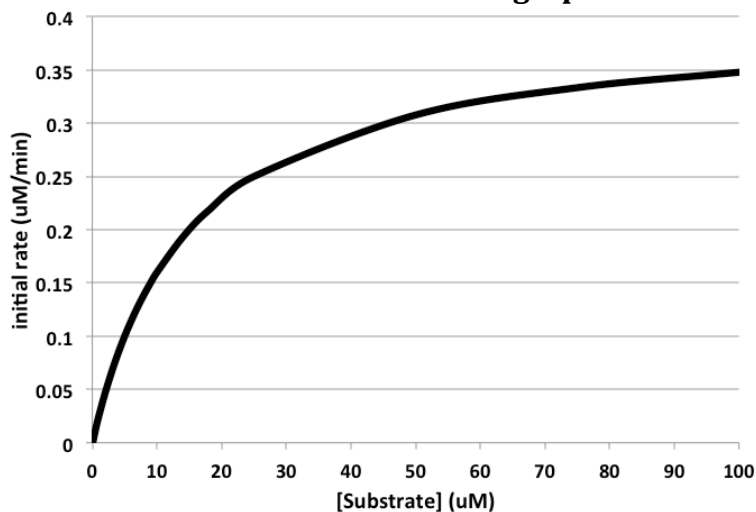
d. Replace  $\frac{(k_{-1}+k_2)}{k_1}$  with  $K_M$ .

e. Write an expression for  $[E]_{total}$ .

f. Use your expression from (e) to get an expression for  $[ES]$  in terms of  $K_M$ ,  $[E]_{total}$ , and  $[S]_0$ .

g. Plug your expression for  $[ES]$  into (a).

2. Determine values of  $V_{max}$  and  $K_M$  from the graph. Include units.



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