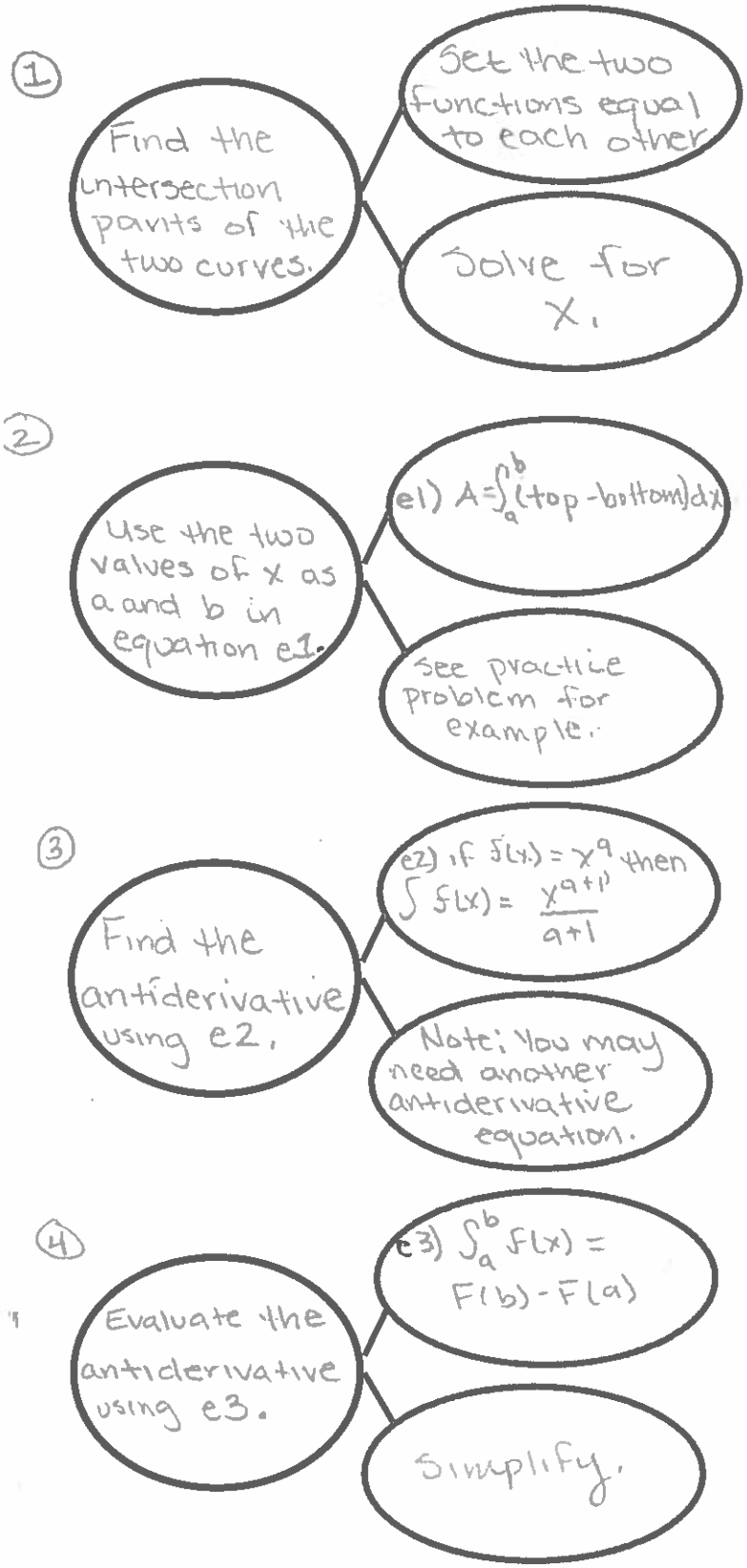
Dennis Learning Center
Study Smarter

Problem Type: Area Between Curves

During exams, it can sometimes be easy to forget the small details associated with answering certain types of problems. This often happens because we study practice problems broadly, rather than the nitpicky details on how to solve them (methodology). Use the diagram below to map out methods to solving problems, rather than solutions to the problems themselves.



Relevant Equations and Ideas

e1) $A=\int_a^b (top-bottom)\,dx$

e2) if $f(x)=x^q$, then $\int f(x)=\frac{x^{q+1}}{q+1}$

e3) $\int_a^b f(x)=F(b)-F(a)$

Practice Problem

Find the area of the region bounded by $y=x^2+2x-6$ and $y=3x$

① $x^2+2x-6=3x$

$x^2-x-6=0$

$(x-3)(x+2)=0$

$x=3$; $x=-2$

② $A=\int_{-2}^{3} 3x-(x^2+2x-6)\,dx$

$=\int_{-2}^{3} 3x-x^2-2x+6\,dx$

$=\int_{-2}^{3} -x^2+x+6\,dx$

③ $=\left[-\frac{x^3}{3}+\frac{x^2}{2}+6x\right]_{-2}^{3}$

④ $=\left(\frac{-27}{3}+\frac{9}{3}+18\right)-\left(\frac{8}{3}+2-12\right)$

$=\boxed{\frac{125}{6}}$