

2. Evaluate $\iint_D xy \, dA$ where D is the region bounded by $y = x - 1$ and $y^2 = 2x + 6$ by following the steps.

a. Find the intersection points of $y = x - 1$ and $y^2 = 2x + 6$.

$$y = \sqrt{2x+6}$$

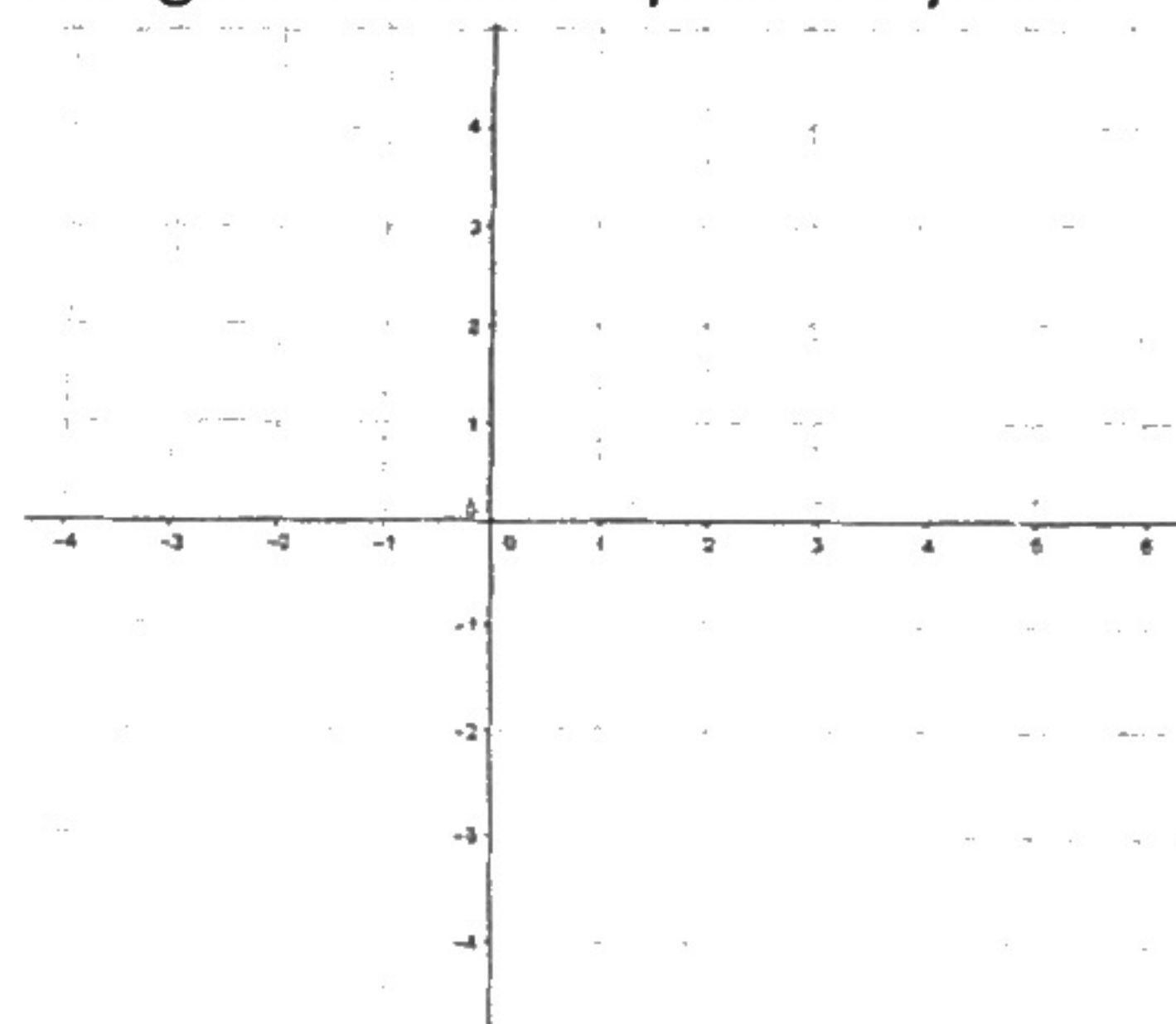
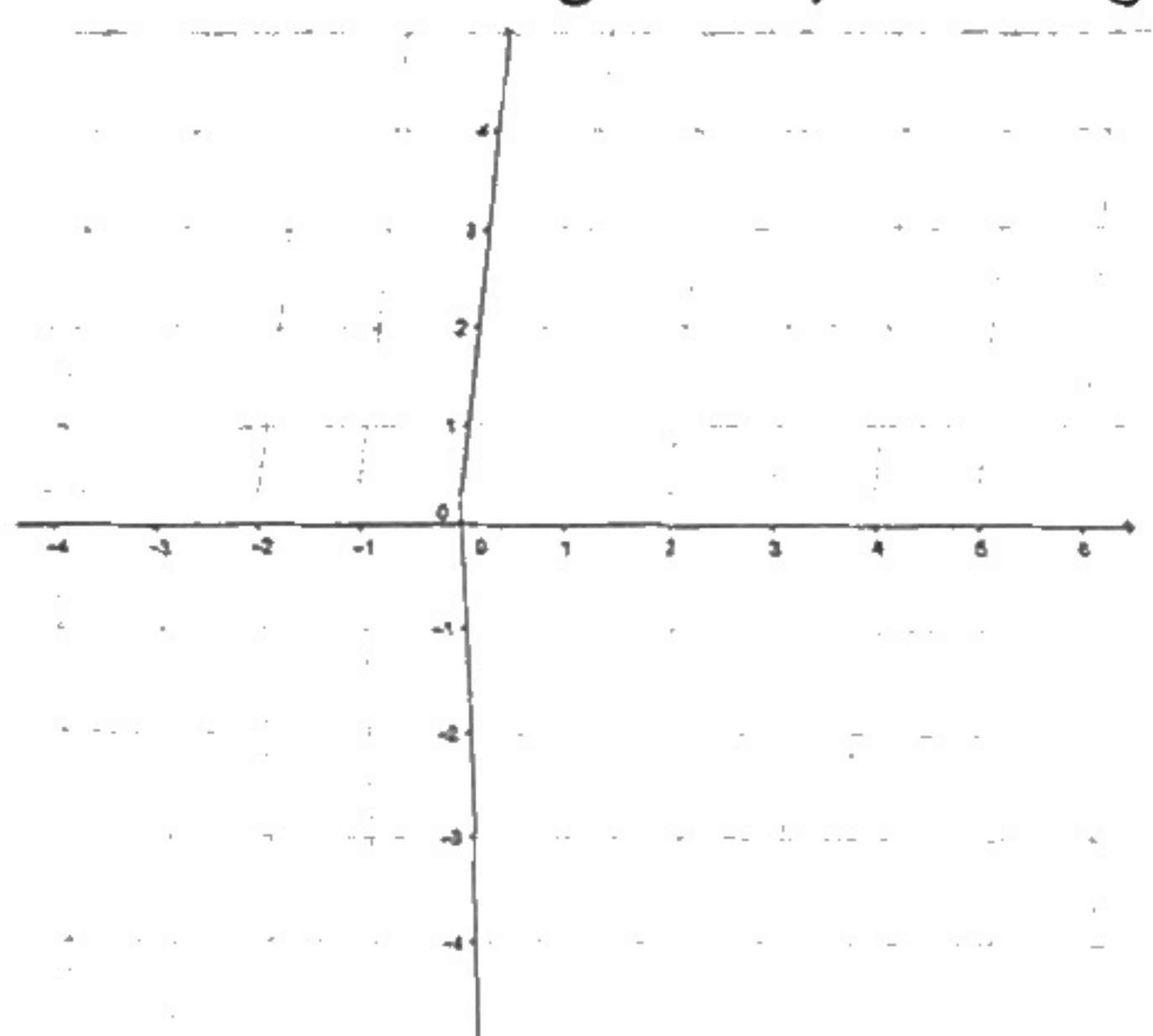
$$y = x - 1$$

b. Graphically, what does $y^2 = 2x + 6$ look like? Where is the vertex of the graph of $y^2 = 2x + 6$?

c. Rewrite the functions in the form $y = \text{function of } x$. You should have three functions.

d. Rewrite the functions in the form $x = \text{function of } y$.

e. Graph the region D . In the picture, label your curves with the correct functions in terms of x . Draw vertical line segments, as though you were going to integrate with respect to y first.



f. Graph the region D again (use the grid above). In the picture, label your curves with the correct functions in terms of y . Draw horizontal line segments, as though you were going to integrate with respect to x first.

g. Setup the integral integrating with respect to y first. Note: YOU ANSWER SHOULD BE A SUM OF TWO INTEGRALS!

h. Setup the integral integrating with respect to x first.

i. Compute the value of the integral.