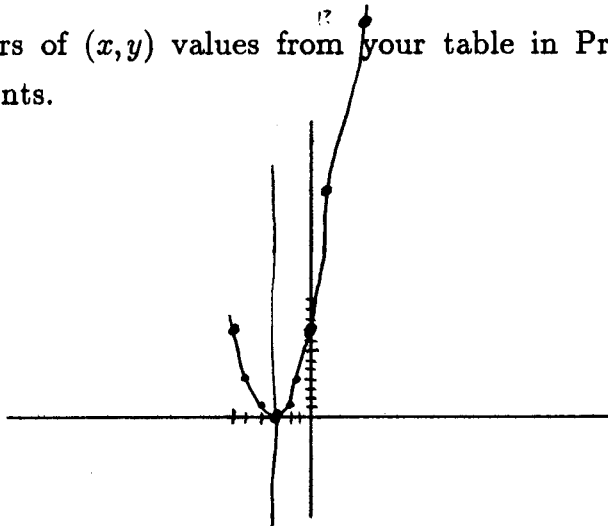


P-19 We now will study the function $y = (x + 3)^2$.

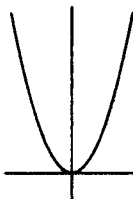
1. The y -value for a given x -value is found by adding three to the x and then squaring the result.

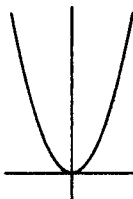
x	-5	-4	-3	-2	-1	0	1	2	3
y	4	1	0	1	4	9	16	25	36

2. Plot the nine pairs of (x, y) values from your table in Problem 1. Draw a smooth curve through your points.



3. Does your graph still look like a parabola? yes Does it have a bottom-most point? yes Where? (-3, 0) Sketch in the vertical line passing through the bottom-most point. If you were to fold your graph along this line, would the two halves exactly match up? yes



4. If you began with your graph of $y = x^2$, , would you need to move it to the LEFT or to the RIGHT to get the graph of $y = (x + 3)^2$? left How far? 3 Does this number appear in the equation? yes Where? inside the What x -value makes the y -value zero? -3 How could you graph $y = (x - 3)^2$ using the graph of $y = x^2$? move it right 3 units What would be the x -value of the bottom-most point of this parabola? 3 How about the graph of $y = (x + 1)^2$? move $y = x^2$ left 1

5. For the function $y = (x - 4)^2 + 1$, you would find the y -value for a given x -value by first subtracting 4 then squaring and finally adding 1. Do these steps have any relation to how you could sketch the graph of this function from the graph of $y = x^2$? yes: move right 4, go up one and draw the parabola