

**Part A:** For the function defined by the formula  $f(x) = x^2 + 5x$ , find and simplify the values: show all your work.

Note: I always put parentheses around what I am substituting into a formula, even if not necessary. Because sometimes the parentheses are needed, and its too easy to forget to put them in!

1)  $f(2) = (2)^2 + 5(2) = 14$

2)  $f(-1) = (-1)^2 + 5(-1) = -4$

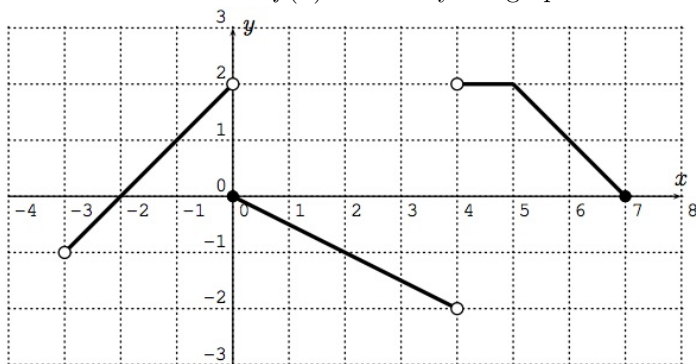
Note: the parentheses around the -1 are needed here; it's wrong if you do not put them in.  $(-1)^2$  is not the same as  $-1^2$

3)  $f(x + 5) = (x + 5)^2 + 5(x + 5)$   
 $= x^2 + 10x + 25 + 5x + 25$   
 $= x^2 + 15x + 50$

4)  $f(x) + 5 = x^2 + 5x + 5$

In particular, notice that  $f(x + 5)$  (adding 5 to the input) is not the same as  $f(x) + 5$  (adding 5 to the output, the value of the function).

**Part B:** For the function  $f(x)$  defined by the graph below:



1) What is  $f(2)$  ?  $f(2) = -1$

2) For which  $x$  is  $f(x) = 0$ ? For  $x = -2, 0$ , or  $7$

3) For which  $x$  is  $f(x) > 0$  ? For  $x$  in  $[-2, 0) \cup (4, 7]$

4) What is the domain of  $f$ ?  $(-3, 4) \cup (4, 7]$

5) What is the range of  $f$ ?  $(-2, 2]$