Math 151

Solutions to selected homework problems

Section 4.1, Problem 22:

Is it possible to define a quadratic polynomial whose graph contains the four points $(-1,-2)$, $(0,-2)$, $(1,0)$, and $(2,2)$?

Solution:

Suppose such a guadratic polynomial ax^2+bx+c exists. Then, plugging in the above x-values and setting the value of the polynomial to the corresponding y-values, we have:
$a-b+c=-2$,
$c=-2$,
$a+b+c=0$,
$4a+2b+c=2$.

Since $c=-2$, the other three equations become:
$a-b=0$,
$a+b=2$,
$4a+2b=4$.

Now adding the first two of these gives $2a=2$, so $a=1$, then $b=1$, however, the third equation gives $4+2=4$, a contradiction.

Therefore there is no such quadratic polynomial.