According to the Standards:

Instructional programs from preK-grade 12 should enable students to:

- Recognize and use connections among mathematical ideas
- Use the language of mathematics to express mathematical ideas precisely
- Select, apply and translate among mathematical representations to solve problems

In grades 9-12 students should

1. Students should develop an increased capacity to link mathematical ideas and a deeper understanding of how more than one approach to the same problem can lead to equivalent results.

Calculus Scope and Sequence: Antiderivatives

Keywords: antidifferentiation, indefinite integral, initial value

Description: This activity will use the indefinite integral to locate one of a family of curves given specific initial information.

Find the equation of a curve such that $y'' = 6x - 8$ *and, at the point (1,0)* $y' = 4$

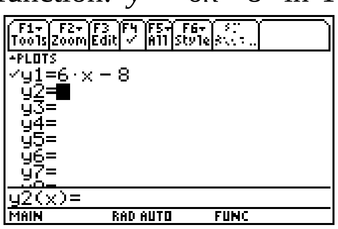
The integral is found in F3-Calc-#2 and requires the following syntax:
(function, variable)

The solve function is found in F2-Algebra-#1 and requires the following syntax:
(expression = expression, variable)

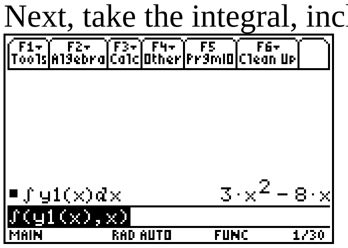
User tips:

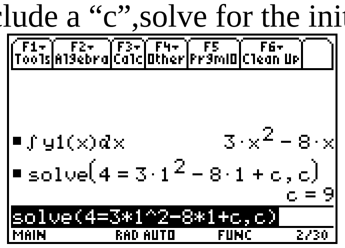
- **It is easier to store the functions in the Y= menu. It makes them easier to access repeatedly.**
- **You can copy and paste a result from the homescreen by using the Up Arrow to highlight it and then pressing ENTER to paste it into the edit line. (You can also use the copy & paste functions in the F1-Tools menu)**

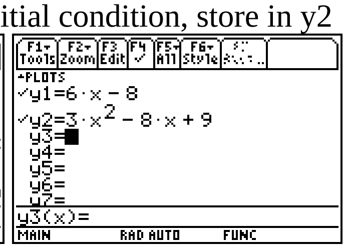
First store the function: $y'' = 6x - 8$ in Y= under y1



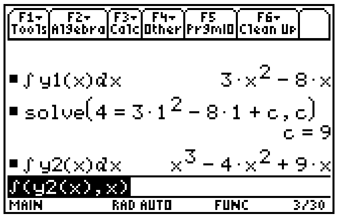
Next, take the integral, include a "c",solve for the initial condition, store in y2

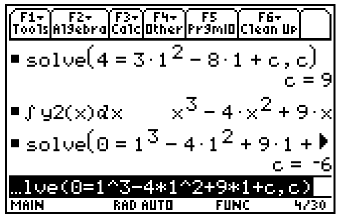


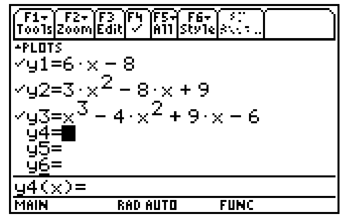




Now, repeat the process with y2 and store the result in y3:

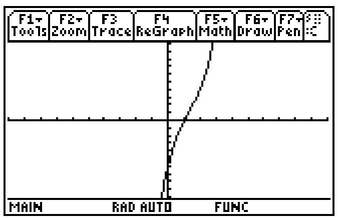


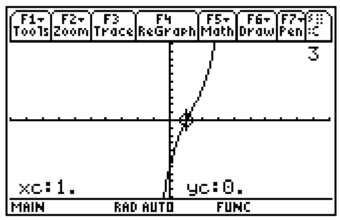


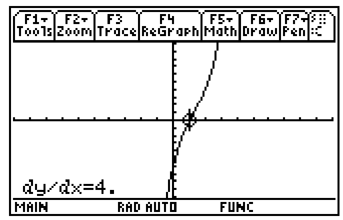


Now, we can confirm graphically by graphing the result and examining the initial conditions:

Function in standard window: Passing thru (1,0) Slope at x = 1







You can use this same method to generate a family of curves for the same slope with a different initial point.