Using nInt to construct a Function with a given Derivative and Value

Part 1 – Solve the following differential equations with an initial value.

1. $f'(x) = 5x$ and $f(2) = 3$
2. $g'(x) = e^x$ and $g(1) = 4$
3. $h'(x) = 2x^3$ and $h(3) = 1$
4. $j'(x) = \cos(x)$ and $j(4) = 5$

Note: We know that if F is any antiderivative of f then

$$F(x) = \int_a^x f(t)dt + C$$

So

$$F(a) = \int_a^a f(t)dt + F(a)$$

Use this fact to construct functions *f, g h and j* with a definite integral.

Part 2 – Fill in the following chart

Answer from Part 1	Use definite integral
f(x) =	f(x) =
g(x) =	g(x) =
h(x)	h(x)
j(x)	j(x)

Part 3

Graph $y_1 = f(x)$ and $y_2 = nInt \int f'(t)dt + f(2)$. (Note – resolution info)

Compare graphs and table values

Graph all the functions g, h and j

Part 4
Use a definite integral to construct the following functions f and function values.

1. a. $f'(x) = \sec^2 x$ and $f(\pi) = 5$.

    b. Find $f(0)$, $f(1)$, and $f(4)$

2. a. $f'(x) = 2^x$ and $f(3) = 10$

    b. Find $f(3)$, $f(0)$ and $f(5)$

Newer TI-89 Titanium Editions (those with operating system OS3.10 and higher) have an option called "Discontinuity Detection". By default, this option is ON on these newer TI-89s. This option deactivates xres, and can also affect the "LINE" and "DOT" modes of graphing. Here are the steps to turn this setting "OFF":
1. Go to the y= screen
2. Press F1: Tools
3. Scroll down to option 9: FORMAT. Press <ENTER>
   This option is initially off the bottom of the screen.
4. On the GRAPH FORMAT SCREEN, scroll down to the "ON"
   following the "Discontinuity Detection" option.
5. Press the right arrow cursor key, and highlight "OFF".
6. Press <<ENTER>> twice.

Owners of Older TI-89s without this option do not have to go through this process