Examples 8.7 – Modeling Accumulated Change with the TI-84

Follow along with your own calculator. Consider the function $f(x) = (x-2)^3 - 5x + 12$ for x in the interval [0, 5]. In the function menu, enter `\Y1=(X-2)^3-5X+12`, and set the viewing window as [0, 5] × [–6, 7].

If we want the net area bounded by the graph of f and the x-axis on an interval, then we use option 7 in the CALCULATE menu.

`1:` To find $\int_1^3 f(x)dx$, for instance, choose `7:∫f(x)dx`, input x = 1 and press **[ENTER]**, and then input x = 3 and press **[ENTER]**. The region bounded by the graph and the x-axis on the chosen interval will be shaded. The result will be the net area.

If we want the total area, then we must work with the absolute value of f. In the function menu, enter `\Y2=abs(Y1(X))`, and set the viewing window as [0, 5] × [–6, 7]. To get the absolute value function, press press **[2ND] [0] [ENTER]** or **[MATH] [▸] [ENTER]**. To get `Y1`, press **[VARS] [▸] [ENTER] [ENTER]**. Now we use option 7 in the calculate menu as before.

`7:` To find $\int_1^3 |f(x)|dx$, for instance, choose `7:∫f(x)dx`, toggle to `Y2`, input x = 1 and press **[ENTER]**, and then input x = 3 and press **[ENTER]**. The region bounded by the graph and the x-axis on the chosen interval will be shaded. The result will be the total area.