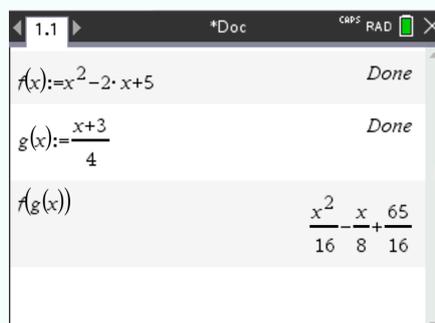## 2.7 Composite functions

2.7.1 Graph the composition of two functions
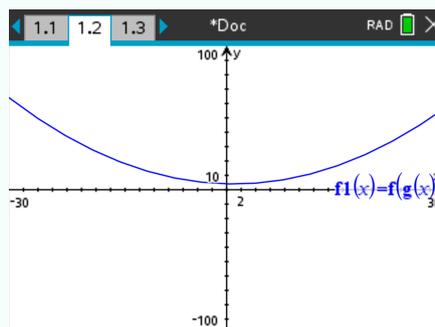
Suppose you want graph $(f \circ g)(x)$ for the following functions:

$$f(x) = x^2 - 2x + 5, \qquad\qquad g(x) = \frac{x+3}{4}.$$

① Create a new document, press [menu] and select Add Calculator.

② Enter the two expressions $f(x)$ and $g(x)$, each in a different line. To do this, write $'\mathbf{f(x)}'$ and press [ctrl] then [≡] . Then, write the expression function of x. Do the same for $g(x)$.

③ Write $'\mathbf{f(g(x))}'$ in a third line and press [enter] . The result is displayed:

④ To plot the function, open a new page by pressing [ctrl] then [doc ▾] . Select Add Graphs.

⑤ Write $'\mathbf{f1(x) = f(g(x))}'$ and press [enter] .

⑥ Choose an appropriate window. To do that, press [menu] and select Window /Zoom > Window Settings. Enter the appropriate values of Xmin, Xmax, Ymin and Ymax. The following graph should be displayed (with **Xmin=-30**, **Xmax=30**, **Ymin=-100**, **Ymax=100**):
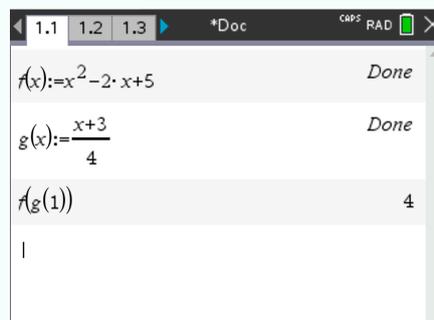

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2.7.2 Compute specific value of the composition of two functions

Suppose you want to evaluate $(f \circ g)(1)$ for the following functions:

$$f(x) = x^2 - 2x + 5 \qquad\qquad g(x) = \frac{x+3}{4}.$$

① Create a new document, press [menu] and select Add Calculator.

② Enter the two expressions $f(x)$ and $g(x)$, each in a different line. To do this, write $'\mathbf{f(x)}'$ and press [ctrl] then [⌐⌐] . Then, write the expression function of x. Do the same for $g(x)$.

③ Write $'\mathbf{f(g(1))}'$ in a third line and press [enter] . The result is displayed:

The result should be 4. Thus $(f \circ g)(1) = 4$.