6.3 Use Operations with Functions

TEKS a.3, a.5, a.6

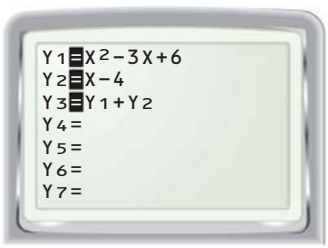
QUESTION How can you use a graphing calculator to perform operations with functions?

EXAMPLE Perform function operations

Let $f(x) = x^2 - 3x + 6$ and $g(x) = x - 4$. Find $f(4) + g(4)$ and $f(g(-2))$.

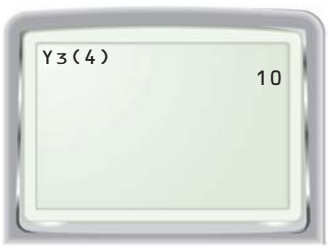
STEP 1 *Form sum*

Enter $y_1 = x^2 - 3x + 6$ and $y_2 = x - 4$. The sum can be entered as $y_3 = y_1 + y_2$. To do so, press VARS, choose the Y-Vars menu, and select Function.



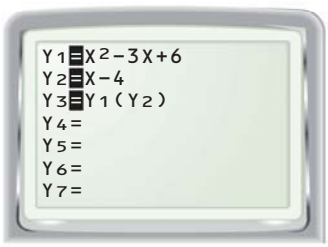
STEP 2 *Evaluate sum*

On the home screen, enter $y_3(4)$ and press ENTER. The screen shows that $y_3(4) = 10$, so $f(4) + g(4) = 10$.



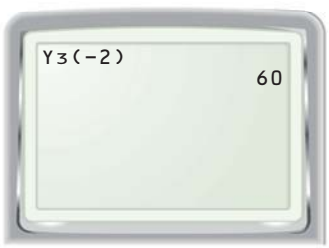
STEP 3 *Form composition*

The composition $f(g(x))$ can be entered as $y_3 = y_1(y_2)$.



STEP 4 *Evaluate composition*

On the home screen, enter $y_3(-2)$ and press ENTER. The screen shows that $y_3(-2) = 60$, so $f(g(-2)) = 60$.



PRACTICE

Use a graphing calculator and the functions f and g to find the indicated value.

1. $f(x) = x^3 + 5x - 3$, $g(x) = -3x^2 - x$: $g(7) + f(7)$

2. $f(x) = x^{1/3}$, $g(x) = 9x$: $\dfrac{f(-8)}{g(-8)}$

3. $f(x) = 5x^3 - 3x^2$, $g(x) = -2x^2 - 5$: $g(2) - f(2)$

4. $f(x) = 2x^2 + 7x - 2$, $g(x) = x - 6$: $f(g(5))$