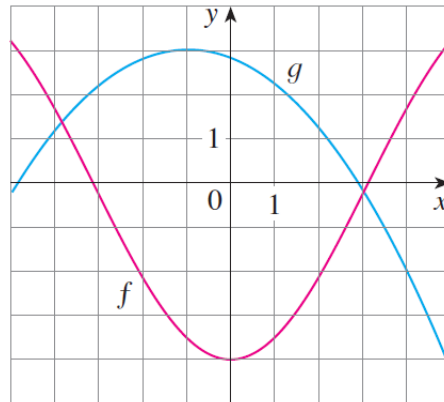


Exercise 54

Use the given graphs of f and g to estimate the value of $f(g(x))$ for $x = -5, -4, -3, \dots, 5$. Use these estimates to sketch a rough graph of $f \circ g$.



Solution

At $x = -5$, $g(x) \approx -0.2$. At $x \approx -0.2$, $f(x) \approx -4$.

$$(f \circ g)(-5) \approx -4$$

At $x = -4$, $g(x) \approx 1.2$. At $x \approx 1.2$, $f(x) \approx -3.4$.

$$(f \circ g)(-4) \approx -3.4$$

At $x = -3$, $g(x) \approx 2.2$. At $x \approx 2.2$, $f(x) \approx -1.9$.

$$(f \circ g)(-3) \approx -1.9$$

At $x = -2$, $g(x) \approx 2.8$. At $x \approx 2.8$, $f(x) \approx -0.5$.

$$(f \circ g)(-2) \approx -0.5$$

At $x = -1$, $g(x) = 3$. At $x = 3$, $f(x) \approx -0.2$.

$$(f \circ g)(-1) \approx -0.2$$

At $x = 0$, $g(x) \approx 2.8$. At $x \approx 2.8$, $f(x) \approx -0.5$.

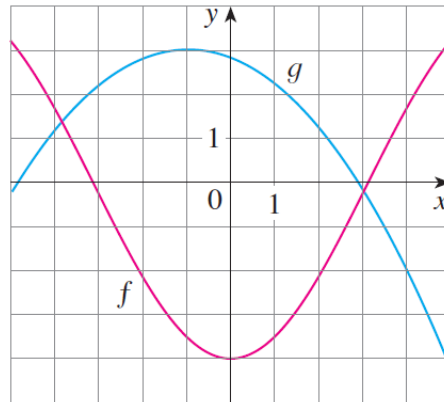
$$(f \circ g)(0) \approx -0.5$$

At $x = 1$, $g(x) \approx 2.2$. At $x \approx 2.2$, $f(x) \approx -1.9$.

$$(f \circ g)(1) \approx -1.9$$

At $x = 2$, $g(x) \approx 1.2$. At $x \approx 1.2$, $f(x) \approx -3.4$.

$$(f \circ g)(2) \approx -3.4$$



At $x = 3$, $g(x) \approx -0.2$. At $x \approx -0.2$, $f(x) \approx -4$.

$$(f \circ g)(3) \approx -4$$

At $x = 4$, $g(x) = -2$. At $x \approx -2$, $f(x) \approx -2.2$.

$$(f \circ g)(4) \approx -2.2$$

At $x = 5$, $g(x) = -4.2$. At $x \approx -4.2$, $f(x) \approx 1.8$.

$$(f \circ g)(5) \approx 1.8$$

Plot the points, $(-5, -4)$, $(-4, -3.4)$, $(-3, -1.9)$, $(-2, -0.5)$, $(-1, -0.2)$, $(0, -0.5)$, $(1, -1.9)$, $(2, -3.4)$, $(3, -4)$, $(4, -2.2)$, and $(5, 1.8)$, and connect them.

