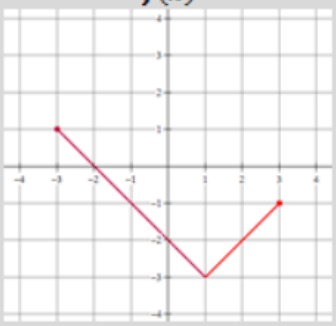
PRACTICE

For 1-4, use the graphs of the functions f and g.

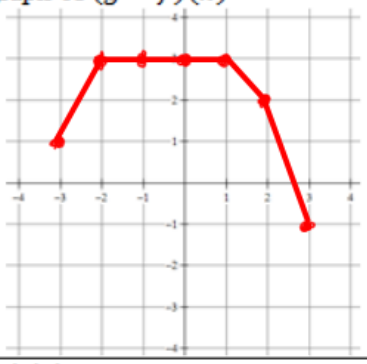
$f(x)$



$g(x)$

1. Sketch a graph of $(f+g)(x)$

2. Sketch a graph of $(g-f)(x)$



2. Find $g(f(2))$

$f(2) = -2$ $g(-2) = 3$

4. Find $(f \circ g)(2) = f(g(2))$

$g(2) = -1$ $f(-1) = -1$

Find the indicated function value, if it exists, given $f(x) = 2 - x$ and $g(x) = \sqrt{3-x}$

5. $(f+g)(-3)$

$g(-3) = \sqrt{3--3} = \sqrt{6}$

$f(-3) = 2 - -3 = 5$

$5 + \sqrt{6}$

6. $(fg)(-1)$

$f(-1) = 2 - -1 = 3$

$g(-1) = \sqrt{3--1} = 2$

$3(2) = 6$

7. $(f \circ g)(-2) = f(g(-2))$

$g(2) = \sqrt{3-2} = \sqrt{5}$

$f(\sqrt{5}) = 2 - \sqrt{5}$

$2 - \sqrt{5}$

For 8-10, use the tables of the functions f and g.

x	$f(x)$
-7	5
-2	9
0	0
4	3
6	-10

x	$g(x)$
-7	4
-2	10
0	-2
4	6
6	-3

8. $(f \circ g)(-7) = f(g(-7))$

$g(-7) = 4$

$f(4) = 3$ 3

9. $f(g(0))$

$g(0) = -2$

$f(-2) = 9$ 9

10. $(f \circ g)(4) = f(g(4))$

$g(4) = 6$

$f(6) = -10$ -10

Find the functions of $f+g, f-g, fg$, and $\frac{f}{g}$, and find their domains.

11. $f(x) = 4x - 3$ and $g(x) = x + 1$

$f+g = 4x-3+x+1$ **Domain:** $(-\infty, \infty)$

$5x-2$

$f-g = 4x-3-(x+1)$ **Domain:** $(-\infty, \infty)$

$4x-3-x-1$

$3x-4$

$fg = (4x-3)(x+1)$ **Domain:** $(-\infty, \infty)$

$4x^2+4x-3x-3$

$4x^2+x-3$

$\frac{f}{g} = \frac{4x-3}{x+1}$ **Domain:** $(-\infty,-1)(-1,\infty)$

12. $f(x) = 3x$ and $g(x) = x^2 - 4$

$f+g = 3x+x^2-4$ **Domain:** $(-\infty, \infty)$

x^2+3x-4

$f-g = 3x-(x^2-4)$ **Domain:** $(-\infty, \infty)$

$3x-x^2+4$

$-x^2+3x+4$

$fg = 3x(x^2-4)$ **Domain:** $(-\infty, \infty)$

$3x^3-12x$

$\frac{f}{g} = \frac{3x}{x^2-4}$ **Domain:** $(-\infty,-2)(-2,2)(2,\infty)$

Find the $(f \circ g)(x), (g \circ f)(x)$, and find their domains.

13. $f(x) = x + 2$ and $g(x) = \frac{1}{x}$

D: $(-\infty,\infty)$ D: $(-\infty,0)(0,\infty)$

$(f \circ g)(x) = \frac{1}{x} + 2$ **Domain:** $(-\infty,0)(0,\infty)$

$(g \circ f)(x) = \frac{1}{x+2}$ **Domain:** $(-\infty,-2)(-2,\infty)$

14. $f(x) = \sqrt{4-x}$ and $g(x) = x^2$

D: $4-x \geq 0$, $x \leq 4$, $(-\infty,4]$ D: $(-\infty,\infty)$

$f(g(x))$ $\sqrt{4-x^2}$ **Domain:** $4-x^2 \geq 0$

$[-2,2]$ $-x^2 \geq -4$

$x^2 \leq 4$

$-2 \leq x \leq 2$

$g(f(x))$ $(\sqrt{4-x})^2$ **Domain:** $(-\infty,4]$

$4-x$

Express h as a composition of two simpler functions f and g.

15. $h(x) = (2x-7)^4$

$g(x) = 2x-7$

$f(x) = x^4$

$f(g(x)) = (2x-7)^4$

16. $h(x) = \frac{4}{\sqrt{x}} + 3$

$g(x) = \sqrt{x}$

$f(x) = \frac{4}{x} + 3$

$f(g(x)) = \frac{4}{\sqrt{x}} + 3$

REVIEW SKILLS

Use the quadratic formula to solve. Express your solution(s) in exact and decimal form.

1. $6b^2 - 22 = 12b$

$-12b \quad -12b$

$6b^2 - 12b - 22 = 0$

$\frac{12 \pm \sqrt{(-12)^2 - 4(6)(-22)}}{2(6)}$

$\frac{12 \pm \sqrt{672}}{12} = \frac{12 \pm 4\sqrt{42}}{12} = \frac{4(3 \pm \sqrt{42})}{3 \cdot 12}$

$b = \frac{3+\sqrt{42}}{3}$ or $\frac{3-\sqrt{42}}{3}$

≈ 3.16 or -1.16

2. $7r^2 - 8r = -10$

$+10 \quad +10$

$7r^2 - 8r + 10 = 0$

$\frac{8 \pm \sqrt{(-8)^2 - 4(7)(10)}}{2(7)}$

$\frac{8 \pm \sqrt{-216}}{14} = \frac{8 \pm 6i\sqrt{6}}{14} = \frac{2(4 \pm 3i\sqrt{6})}{7 \cdot 2}$

$r = \frac{4+3i\sqrt{6}}{7}$ or $\frac{4-3i\sqrt{6}}{7}$

$\approx 0.57 + 1.049i \quad 0.57 - 1.049i$