Let $f(x) = \sqrt{4-x}$ and $g(x) = x^2 + 2x$. $+1\ -1$

5. Find domain and range of $f \circ g$.

$(x+1)^2-1$

f $\qquad$ g

D_f: $x \le 4$

R_f: $-x \ge -4$

$4-x \ge 0$

$\sqrt{4-x} \ge 0$

D_g: $-\infty < x < \infty$

$-\infty < x+1 < \infty$

$0 \le (x+1)^2 < \infty$

$-1 \le (x+1)^2 - 1 < \infty$

$-1 \le (x+1)^2 - 1 \le 4$

$0 \le (x+1)^2 \le 5$

$-\sqrt{5} \le x+1 \le \sqrt{5}$

$-\sqrt{5}-1 \le x \le \sqrt{5}-1$

$a^2 \le 5$

$a^2 - 5 \le 0$

$(a-\sqrt{5})(a+\sqrt{5}) \le 0$

$-\sqrt{5}$ $\qquad$ $\sqrt{5}$

$f \circ g = \sqrt{4-(x+1)^2+1}$

(R) $-\sqrt{5} \le x+1 \le \sqrt{5}$

$0 \le (x+1)^2 \le 5$

$0 \ge -(x+1)^2 \ge -5$

$5 \ge 5-(x+1)^2 \ge 0$

$\sqrt{5} \ge \sqrt{5-(x+1)^2} \ge 0$

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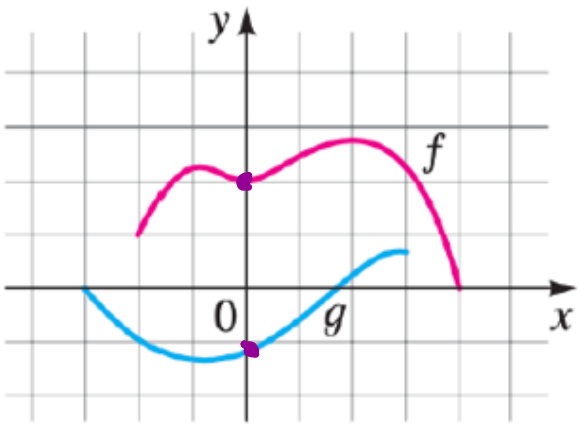
2. Evaluate the given expression. (You can approximate the values from the graphs.)



a. $f(g(1))$

b. $(fg)(0)$ $= f(0) \cdot g(0)$
$= 2 \cdot (-1.1) = -2.2$

c. $(f+g)(2)$ $= f(2) + g(2)$
$2.75 + .25 = 3$

d. $\left(\frac{f}{g}\right)(4)$ $= \frac{f(4)}{g(4)} = \frac{0}{\text{und.}}$

b. $y = f\left(\frac{x}{2}\right)$

h. scaly by 2

$[-2, 5] \longrightarrow [-4, 10]$

$(x+1)^2-1$ ← g ← f → $\sqrt{4-x}$

6. Find domain and range of $g \circ f$.

D_g: $x \in \mathbb{R}$

R_g: $y \geq -1$

D_f: $x \leq 4$

R_f: $y \geq 0$

D: $x \leq 4$

$-x \geq -4$

$4-x \geq 0$

$\sqrt{4-x} \geq 0$

$(\sqrt{4-x}+1)^2-1$

$(\sqrt{4-x}+1)^2 \geq (1)^2$

$(\sqrt{4-x}+1)^2-1 \geq 0$

b. f/g

$D_f: x \leq 4 \quad D_g: x \in \mathbb{R}$

$D_f \cap D_g \cap g \neq 0$

$(x \leq 4) \cap (x \neq 0, -2)$

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