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|--------|---|---|---|---|---|---|
| x | 1 | 2 | 3 | 4 | 5 | 6 |
| $f(x)$ | 2 | 4 | 4 | 6 | 3 | 1 |
| $g(x)$ | 1 | 1 | 1 | 5 | 2 | 5 |
| $h(x)$ | 4 | 4 | 3 | 1 | 2 | 2 |

1. Using the table above, evaluate the following:

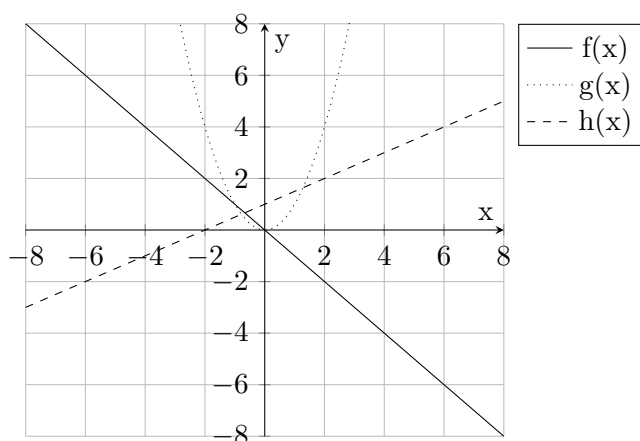
(a) $f(h(f(1))) \div (f \circ g)(2)$

(c) $g(f(3)) - h(h(2))$

(b) $(h \circ g \circ f)(5)$

(d) $(f \circ g)(h(f(4)))$

2. From the graphs of f , g , and h below, estimate the values of $g(f(h(x)))$ for $\{x \in \mathbb{Z} \mid -3 \leq x \leq 3\}$.



3. From f and g defined below, evaluate each expression or state why it is undefined.

$$f(x) = -|x + 2| - 3, \quad g(x) = \begin{cases} -x & \text{if } x < 0 \\ x^2 & \text{if } x \geq 0 \end{cases}$$

(a) $(f \circ g)(3) - g(f(2))$

(c) $(f \circ f)(-3) \div g(2)$

(b) $(fg)(-2) + g(-6)$

(d) $\left(\frac{f}{g}\right)(0)$

4. For each part, find the following functions and their domains: $(f \circ g)$, $(g \circ f)$, $(f \circ f)$, and $(g \circ g)$.

(a) $f(x) = x^2$, $g(x) = 2x - 1$

(b) $f(x) = \sqrt{x^2 - \frac{1}{2}}$, $g(x) = \sin(x)$

5. Find $f \circ g \circ h$.

(a) $f(x) = \sqrt{\frac{1}{1-x^2}}$, $g(x) = e^{2x}$, $h(x) = \sin(x)$

(b) $f(x) = \tan(x)$, $g(x) = \tan^{-1}(x)$, $h(x) = e^x$

6. Express each function in the form $f \circ g$:

(a) $A(x) = \ln\left(\frac{1}{x^{\frac{1}{x}}}\right)$

(b) $B(x) = \frac{(x^2-2x+1)(x+1)^2}{(x^2-1)(x^2)}$