Purpose: This problem set focuses on practicing function evaluation which is an essential skill moving toward analyzing functions and their behavior.

For these exercises, assume

$$f(x) = \begin{cases} \dfrac{x+2}{x^2+1} & \text{if } x > 3 \\[2ex] 0 & \text{if } x = 3 \\[2ex] |2x| & \text{if } x < 3 \end{cases}$$

with domain $\mathbb{R}$. Evaluate and simplify each of the following expressions

1. $f(2)$

3. $f(3)$

2. $f(-2)$

4. $f(x^2 + 3)$

For these exercises, assume

$$g(x) = \frac{x-2}{x+2}$$

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1. Find a number b such that $g(b) = 3$.

2. Simplify the expression $\dfrac{g(x) - g(2)}{x - 2}$.

3. Simplify the expression $\dfrac{g(a+t) - g(a)}{t}$.

4. Simplify the expression $\dfrac{g(x+b) - g(x-b)}{2b}$.