

Computational Problems

Please show your work.

4. (6 points) Consider the piecewise function defined below. Find $f(-9)$, $f(-1)$, $f(\frac{3}{2})$, $f(-\frac{1}{2})$, $f(\frac{1}{2})$, and $f(6)$.

$$f(x) = \begin{cases} x^2 & x \leq -1 \\ -x & -1 \leq x \leq 0 \\ x & 0 \leq x \leq 1 \\ x^2 & x \geq 1 \end{cases}$$

5. (4 points) Rationalize the denominator of the expression. Simplify your answer.

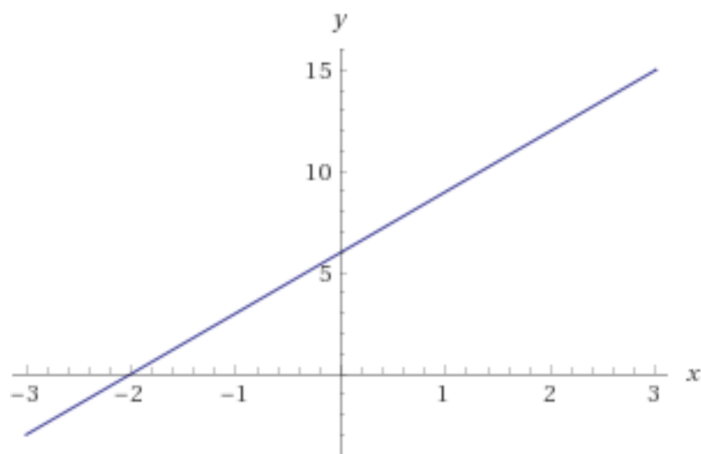
$$\frac{3}{\sqrt{5} - \sqrt{8}}$$

6. (4 points) Let $f(x) = \sqrt{x-2}$ and $g(x) = \frac{1}{x-3}$.

a. Find the domain of $f(x)$.

b. Find the domain of the composition $(g \circ f)(x)$.

7. (4 points) Find the equation (**in standard form**) of the linear function passing through the point $(1, -1)$ and perpendicular to the line graphed below.



8. (4 points) Please draw the graph of the function $g(x) = -2|x - 2| + 1$.

9. (4 points) Let $f(x) = (2x - 1)^2 - 12x^2 + 20x - 11$ and assume $f(x) = (g \circ h)(x)$ where $h(x) = 2x$. Find the function $g(x)$.