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Topic 1: Restriction on a variable in a denominator: Quadratic

Problem 1: Find the restrictions on the variable x in the expression $5/(x^2 - 4)$.

Identify the values that make the denominator zero and state the restrictions.

Problem 2: Determine the restrictions on x for the expression $3/(x^2 + 2x - 3)$. Factor the denominator and list the excluded values.

Topic 2: Finding an output of a function from its graph

The graph of a function f is shown below.

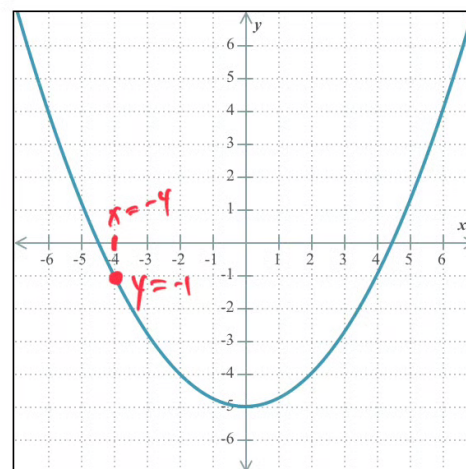
Find $f(-4)$.

$$f(x) = y$$

$$(x, y)$$

$$f(-4) = -1$$

$$x = -4 \quad y = ?$$



Topic 3: Graphing a function of the form $f(x) = ax + b$: Fractional slope

Problem 1: Graph the function $f(x) = (2/3)x - 1$. Identify the slope and y-intercept, and plot the line using two points.

Problem 2: Sketch the function $f(x) = -(1/4)x + 2$. Label the slope and y-intercept, and verify the line by checking a third point.

Topic 4: Even and odd functions: Problem type 1

Problem 1: Determine if the function $f(x) = x^4 + 2x^2$ is even, odd, or neither. Test by evaluating $f(-x)$ and compare with $f(x)$.

Problem 2: Check if the function $g(x) = x^3 - x$ is even, odd, or neither. Show the

Problem 2: Check if the function $g(x) = x^3 - x$ is even, odd, or neither. Show the algebraic steps using $g(-x)$ and explain the conclusion.

Topic 5: Sum, difference, and product of two functions

Problem 1: Given $f(x) = 2x + 1$ and $g(x) = x - 3$, find $(f + g)(x)$, $(f - g)(x)$, and $(f \cdot g)(x)$. Simplify each result.

Problem 2: For $f(x) = x^2$ and $g(x) = 3x - 2$, compute $(f + g)(x)$, $(f - g)(x)$, and $(f \cdot g)(x)$. Provide the simplified expressions.

Topic 6: Quotient of two functions: Basic

Problem 1: Given $f(x) = 4x$ and $g(x) = x + 2$, find $(f/g)(x)$ and state its domain. Identify any restrictions due to the denominator.

Problem 2: For $f(x) = x - 1$ and $g(x) = x - 5$, determine $(f/g)(x)$ and find the domain by identifying excluded values.

Topic 7: Introduction to the composition of two functions

Problem 1: Given $f(x) = x + 3$ and $g(x) = 2x$, find $(f \circ g)(x)$. Show the process of substituting $g(x)$ into $f(x)$.

Problem 2: For $f(x) = x^2$ and $g(x) = x - 1$, compute $(g \circ f)(x)$. Explain the steps of composing the functions.

Topic 8: Composition of two functions: Basic

Problem 1: Given $f(x) = 3x - 2$ and $g(x) = x + 4$, find $(f \circ g)(2)$. Compute the composition and evaluate at $x = 2$.

Problem 2: For $f(x) = x^2 + 1$ and $g(x) = 2x$, find $(g \circ f)(1)$. Show the substitution and simplify the result.

Topic 9: Composition of two functions: Advanced

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