

MATH 1150: Midterm 1 Practice

1. Simplify the expression completely: $\frac{2x}{x^2 - 4} - \frac{1}{x - 2}$.

2. Simplify the expression: $\left(\frac{4x^{-2}y^3}{2x^3y^{-1}}\right)^{-2}$.

3. Solve for x if $|3 - 4x| = 7$.

4. Solve the inequality: $3|x + 2| - 5 \leq 10$.

5. Let

$$f(x) = \sqrt{2x - 4} + \frac{1}{x - 3}.$$

(a) Find the domain of f .

(b) Evaluate $f(5)$.

6. Consider the function

$$g(x) = \begin{cases} 2x - 1, & x < 1, \\ x^2, & x \geq 1. \end{cases}$$

(a) Evaluate $g(0)$, $g(1)$, and $g(-2)$.

(b) Solve for all x such that $g(x) = 4$.

7. A function $h(t) = 15 + 4t$ gives the height (in centimeters) of a plant t days after planting. Explain the meaning of $h(5) = 35$.

8. For the function $f(x) = x^2 - 3x + 2$, compute the difference quotient $\frac{f(x+h)-f(x)}{h}$, and simplify your answer.

9. Let $f(x) = 3x - 2$ and $g(x) = x^2 + 1$. Find:

(a) $(f + g)(x)$,

(b) $(f \cdot g)(x)$, and

(c) $\left(\frac{f}{g}\right)(x)$.

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

(a) Find the formula for $(f \circ g)(x)$.

(b) Evaluate $(f \circ g)(3)$.

11. Consider the function $f(x) = |x|$. A new function $g(x)$ is obtained by performing the following transformations in order:

1. Shift $f(x)$ 3 units to the right,

2. Reflect it across the x -axis,

3. Vertically stretch it by a factor of 2,

4. Shift it upward by 5 units.

Write the formula for $g(x)$.

12. Determine whether the function $f(x) = x^3 - x$ is even, odd, or neither.