Rational Expressions Quiz

Name: _____ Date: _____

Instructions

In this quiz, you will simplify rational expressions and state their domains. Follow the example provided to guide you through the process. Show all your work in the space provided, and write your final answers clearly.

Example: Simplify and State the Domain

Simplify the following expression and state its domain:

$$\frac{(a+x)(x-b)}{(b-x)(a+x)}$$

Solution

1. **Simplify the expression.**
   - Rewrite the denominator: Notice that $b - x = -(x - b)$.
   - The expression becomes:
   $$\frac{(a+x)(x-b)}{-(x-b)(a+x)}$$
   - Cancel the common factors $(a + x)$ and $(x - b)$:
   $$\frac{1}{-1} = -1$$
   - **Simplified form:** -1
2. **State the domain.**
   - The denominator is $(b - x)(a + x)$. Set each factor to zero:
   $$b - x = 0 \quad \text{or} \quad a + x = 0$$
   $$x = b \quad \text{or} \quad x = -a$$
   - **Domain:** All real numbers except $x \neq b$ and $x \neq -a$.

Problems

For each problem, simplify the rational expression and state its domain. Show your work in the space provided.

1. Simplify and state the domain of:

$$\frac{(x+a)(x+b)}{(x-b)(x+a)}$$

Simplified form: _____

Domain: _____

2. Simplify and state the domain of:

$$\frac{(x-a)(b+x)}{(x+a)(x-a)}$$

Simplified form: _____

Domain: _____

3. Simplify and state the domain of:

$$\frac{(a-x)(b+x)}{(x-a)(b+x)}$$

Simplified form: _____

Domain: _____

4. Simplify and state the domain of:

$$\frac{(x-a)(x+b)}{(a-x)(x+b)}$$

Simplified form: _____

Domain: _____