

Quiz 2

3 September 2009

Show all work to support your solution. Be sure to check your solutions.

1. Consider the rational expression $\frac{x+5}{x^2+4x-5}$.

(a) (3 Points) State the implied domain of this expression.

Consider when the denominator is zero. Note that

$$x^2 + 4x - 5 = (x - 1)(x + 5).$$

By the zero product property, either $x - 1 = 0$ or $x + 5 = 0$. Thus, the denominator can only be 0 when $x = 1, -5$. Hence, the domain is

$$\{x \in \mathbb{R} : x \neq 1, -5\} = (-\infty, -5,) \cup (-5, 1) \cup (1, \infty).$$

(b) (2 Points) Write a reduced formula for this expression.

$$\frac{x+5}{x^2+4x-5} = \frac{x+5}{(x-1)(x+5)} = \frac{1}{x-1}, x \neq -5.$$

2. (5 Points) Perform the following operation.

$$\begin{aligned} & \frac{a^2+1}{a^2-1} - \frac{a-1}{a+1} \\ &= \frac{a^2+1}{(a+1)(a-1)} - \frac{a-1}{a+1} = \frac{a^2+1}{(a+1)(a-1)} - \frac{(a-1)^2}{(a+1)(a-1)} = \frac{a^2+1-(a-1)^2}{(a+1)(a-1)} \\ &= \frac{a^2+1-(a^2-2a+1)}{(a+1)(a-1)} = \frac{a^2+1-a^2+2a-1}{(a+1)(a-1)} = \frac{2a}{(a+1)(a-1)} \end{aligned}$$