

# SOLUTIONS

Math 71 Spring 2006

QUIZ #6@ 15 points

Name: \_\_\_\_\_

Write in a neat and organized fashion. You should use a pencil. For an exercise to be complete there needs to be a detailed solution to the problem. Do not just write down an answer. No proof, no credit given.

1. Find the domain of the function  $f(x) = \frac{3x}{x^2 - 8x + 15}$ .

CONDITION:  
 $x^2 - 8x + 15 \neq 0$

$$\begin{aligned} x^2 - 8x + 15 &= 0 \\ (x-3)(x-5) &= 0 \\ x &= 3 \text{ OR } x = 5 \end{aligned}$$

$$\boxed{\text{Domain} = \mathbb{R} \setminus \{3, 5\}}$$

OR

$$\boxed{\text{Domain: } x \neq 3, x \neq 5}$$

2. Simplify the following:

a)  $\frac{3x}{x^2 - 25} - \frac{4}{x + 5} =$

$$= \frac{3x}{(x+5)(x-5)} - \frac{4}{x+5}$$

LLO =  $(x+5)(x-5)$

$$= \frac{3x - 4(x-5)}{(x+5)(x-5)}$$

$$= \frac{3x - 4x + 20}{(x+5)(x-5)}$$

$$= \boxed{\frac{20 - x}{(x+5)(x-5)}}$$

b)  $\frac{x+2y}{x^2 + 4xy + 4y^2} \cdot \frac{x^2 - 4y^2}{2x} =$

$$= \frac{x+2y}{(x+2y)^2} \cdot \frac{(x-2y)(x+2y)}{2x}$$

$$= \boxed{\frac{x-2y}{2x}}$$

c)  $(2x^{-1} + y^{-1})^{-1} = \frac{1}{2x^{-1} + y^{-1}} =$

$$= \frac{1}{\frac{2}{x} + \frac{1}{y}} = \frac{1}{\frac{2y+x}{xy}}$$

LLO =  $xy$

$$= \boxed{\frac{xy}{2y+x}}$$

d)  $\frac{\frac{3}{x} - 3}{\frac{8}{x} - 8} = \frac{\frac{3}{x} - \frac{3}{1}}{\frac{8}{x} - \frac{8}{1}}$ 

LLO =  $x$

$$= \frac{3 - 3x}{8 - 8x}$$

$$= \frac{3 - 3x}{x} \div \frac{8 - 8x}{x}$$

$$= \frac{3(1-x)}{x} \cdot \frac{x}{8(1-x)} = \boxed{\frac{3}{8}}$$