MATH 119: Quiz 1

Name: _key_

Directions: No calculators. Do everything by hand. Good luck!

1. (a) State the LCD **and** add.

$$\frac{1}{x+1} + \frac{2}{x+2} + \frac{3}{x+3} + \frac{4}{(x+1)(x+2)}$$

LCD: $(x+1)(x+2)(x+3)$

$$\frac{(x+2)(x+3)}{(x+2)(x+3)} \cdot \frac{1}{x+1} + \frac{(x+1)(x+3)}{(x+1)(x+3)} \cdot \frac{2}{(x+2)} + \frac{(x+1)(x+2)}{(x+1)(x+2)} \cdot \frac{3}{(x+3)} + \frac{(x+3)}{(x+3)} \cdot \frac{4}{(x+1)(x+2)}$$

$$= \frac{x^2 + 5x + 6}{(x+1)(x+2)(x+3)} + \frac{2(x^2+4x+3)}{(x+1)(x+2)(x+3)} + \frac{3(x^2+3x+2)}{(x+1)(x+2)(x+3)} + \frac{4x+12}{(x+1)(x+2)(x+3)}$$

$$= \frac{x^2 + 5x + 6 + 2x^2 + 8x + 6 + 3x^2 + 9x + 6 + 4x + 12}{(x+1)(x+2)(x+3)}$$

$$= \frac{6x^2 + 26x + 30}{(x+1)(x+2)(x+3)}$$

(b) What is the domain of the previous expression?

$$\{x : x \in \mathbb{R}, \; x \neq -1, -2, -3\}$$

2. Fully simplify this expression:

$$\frac{x^2 + 4x + 4}{x + 3} \cdot \frac{1}{x^2 + 5x + 6}$$

$$\begin{array}{cc} & (\ 2 \\ \nearrow & |\ 2 \end{array} \longrightarrow \begin{array}{cc} | & 3 \\ | & 2 \end{array}$$

$$= \frac{(x+2)^2}{(x+3)} \cdot \frac{1}{(x+2)(x+3)}$$

$$= \frac{(x+2)^2}{(x+2)(x+3)^2} = \frac{(x+2)}{(x+3)^2}$$