

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

$$\begin{aligned} & \frac{(x+2)(x+3)}{(x+2)(x+3)} \cdot \frac{1}{x+1} + \frac{(x+1)(x+3)}{(x+1)(x+3)} \cdot \frac{2}{x+2} + \frac{(x+1)(x+2)}{(x+1)(x+2)} \cdot \frac{3}{x+3} + \frac{(x+3)}{(x+3)} \cdot \frac{4}{(x+1)(x+2)} \\ &= \frac{x^2 + 5x + 6}{(x+1)(x+2)(x+3)} + \frac{2(x^2 + 4x + 3)}{(x+1)(x+2)(x+3)} + \frac{3(x^2 + 3x + 2)}{(x+1)(x+2)(x+3)} + \frac{4x + 12}{(x+1)(x+2)(x+3)} \\ &= \frac{x^2 + 5x + 6 + 2x^2 + 8x + 6 + 3x^2 + 9x + 6 + 4x + 12}{(x+1)(x+2)(x+3)} \\ &= \frac{6x^2 + 26x + 30}{(x+1)(x+2)(x+3)} \end{aligned}$$

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

$$\{x : x \neq 1, 2, 3\}$$

2. Fully simplify this expression:

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

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

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