2002-03 Event 2A

The first question is intended to be a quickie and is worth 1 point. Each of the next three questions is worth 2 points. Place your answer to each question on the line provided. You have 12 minutes for this event.

No calculators allowed in this event

1. Express as an equation the statement that \( x \) is 3 less than the sum of \( b \) and the reciprocal of \( c \).

2. Given the equation below, express \( x \) as the quotient of two terms in \( a \) and \( b \); i.e. solve for \( x \) and simplify your answer.

\[
5x + \frac{5}{12} = 12x + \frac{12}{5}
\]

3. For the equation below, express \( x \) as the quotient of two relatively prime integers.

\[
\frac{1}{x-3} + \frac{1}{x+2} = \frac{2x}{x^2 - 5x + 6}
\]

4. [D] Professor Branebomb watched a man digging a hole outside Mathematics Hall at Wizzard U. "How much deeper are you going?" he asked. Knowing where he was working, the digger replied, "I am one third done; and when I am finished, the top of my head will be twice as far below ground as it now is above ground." The professor said, "I'll need to know your height if I'm to figure the answer to my question." The man then said that he was five feet, ten inches tall. How deep will the hole be when it is finished?

Name __________________________ Team __________________________