

Question:	1	2	Total
Points:	5	5	10
Score:			

In order to receive full credit, you must **show all your work** and simplify your answers.

1. (5 points) Simplify the following:

$$\frac{\frac{1}{x} - \frac{1}{x+5}}{\frac{60}{5+x}} =$$

**Solution:**

Method I:

$$\frac{\frac{1}{x} - \frac{1}{x+5}}{\frac{60}{5+x}} = \frac{\frac{1}{x} \cdot \frac{(x+5)}{(x+5)} - \frac{1}{x+5} \cdot \frac{x}{x}}{\frac{60}{5+x}} = \frac{\frac{(x+5) - x}{x(x+5)}}{\frac{60}{5+x}} = \frac{5}{x(x+5)} \cdot \frac{5+x}{60} = \frac{5}{60x} = \frac{1}{12x}$$

Method II: use the LCD of all individual terms, which is  $x(x+5)$

$$\frac{\frac{1}{x} - \frac{1}{x+5}}{\frac{60}{5+x}} \cdot \frac{x(x+5)}{x(x+5)} = \frac{\frac{x(x+5)}{x} - \frac{x(x+5)}{x+5}}{\frac{60x(x+5)}{5+x}} = \frac{(x+5) - x}{60x} = \frac{5}{60x} = \frac{1}{12x}$$

2. (5 points) Simplify the following complex fraction:

$$\frac{3 - \frac{1}{2x}}{2 + \frac{1}{x^2}} =$$

**Solution:**

Method I:

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

Method II: use the LCD of all individual terms, which is  $2x^2$

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