

YOUR NAME: \_\_\_\_\_

George Voutsadakis

Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Perform the following operations and write your result in lowest terms:

(a)

$$\frac{10x + 5}{5x^2 + 5} \cdot \frac{2x^2 + x - 1}{4x^2 - 1}$$

(b)

$$\frac{5 - 10x}{x^2 - 2x} \div \frac{2x^2 + 7x - 4}{x^2 + 2x - 8}$$

2. Perform the following operations and write your answer in lowest terms:

(a)

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

(b)

$$\frac{8x}{2x^2 + 4x + 2} - \frac{3x - 3}{x^2 - 1}$$

3. Simplify the following complex fraction:

$$\frac{\frac{x+4}{x+1} + \frac{4}{x}}{\frac{x+1}{x} - \frac{1}{x+1}}$$

4. Perform the long division to write the following expression in the form quotient +  $\frac{\text{remainder}}{\text{divisor}}$ .

$$(6x^3 - 7x^2 + 5x + 6) \div (3x - 2)$$

5. Perform the synthetic division to write the following expression in the form quotient +  $\frac{\text{remainder}}{\text{divisor}}$ .

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