HOMEWORK 10 - MATH 102 DUE DATE: WEEK BEFORE EXAMS INSTRUCTOR: George Voutsadakis

Read each problem **very carefully** before starting to solve it. Four out of the eight problems will be chosen at random and graded. Each problem graded is worth 3 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

- 1. Solve the following equations:
 - (a) $\frac{x}{x+4} + \frac{x}{x-2} = -\frac{1}{2}$ (b) $\frac{2x}{x-2} + \frac{x}{x-1} = \frac{7}{6}$
- 2. Solve the following equations using substitution:
 - (a) $x^6 26x^3 27 = 0$

(b)
$$y^{2/3} + 5y^{1/3} = -6$$

- (c) $(x^2 + 3x) + 5\sqrt{x^2 + 3x} 14 = 0$
- 3. Solve the following inequalities and graph the solution set:
 - (a) $x^2 2x 3 > 0$
 - (b) $x^2 + 8x \le -16$
- 4. Solve the polynomial inequality $(x-2)(x-3)(x+4) \leq 0$ and graph the solution set.
- 5. Solve the following rational inequalities and graph the solution set:
 - (a) $\frac{x+5}{x-3} > 2$ (b) $\frac{3}{x} + 1 < \frac{1}{x} - 2$
- 6. Find the formulas of the functions $(f \circ g)(x), (g \circ f)(x)$ and $(f \circ f)(x)$ if $f(x) = x^2 + 3$ and g(x) = x 1. Simplify your answers.
- 7. Suppose that $f(x) = \frac{5x}{x+2}$ and $g(x) = \frac{x}{x+3}$. Find the domains of f, of g, of the sum f + g, of the product $f \cdot g$ and of the quotient $\frac{f}{g}$.
- 8. Find a formula for the inverse function $f^{-1}(x)$ if

(a)
$$f(x) = \sqrt{x^7 - 3}$$

(b) $f(x) = \frac{3x-2}{2x+5}$