HOMEWORK 8 - MATH 102 DUE DATE: Monday, April 9

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. Use long division to find the quotient and the remainder of
 - (a) $2x^3 + 2x + 7x^2 + 5$ by 2x 1
 - (b) $x^5 x^4 + 10 27x + 7x^2$ by $x^3 + 5 x$
- 2. Factor completely $x^4 22x^2 75$ if $x^2 + 3$ is one of the factors. Do the same with $x^3 4x^2 + x + 6$ if x 3 is one of its factors.
- 3. Use synthetic division to find the quotient and the remainder of
 - (a) $(x^3 + 4x^2 7x + 8) \div (x 2)$
 - (b) $(4x^4 + 20x^3 x^2 2x + 15) \div (x+5)$
- 4. Solve the rational equations
 - (a) $\frac{10}{3x} \frac{9}{2x} = \frac{7}{30}$ (b) $\frac{2}{x^2 - 4} + \frac{5}{x + 2} = \frac{7}{x - 2}$ (c) $4x^{-1} + 6x^{-1} = 15(x + 1)^{-1}$
- 5. The sum of an integer and its reciprocal is $\frac{82}{9}$ find the integer.
- 6. A faucet fills in a tank in 6 hours and the drain pipe empties it in 9 hours. If the faucet and the drain pipe are both open, how long does it take to fill the tank?
- 7. Evaluate if possible:
 - (a) $\sqrt[3]{-8}$ (b) $\sqrt[5]{\frac{-1}{243}}$ (c) $(\frac{1}{81})^{-1/4}$ (d) $125^{-2/3}$
- 8. Simplify and write the expression with positive exponents:

(a)
$$\frac{x^{4/5}}{x^{-3/5}}$$

(b) $(x^{2/7})^{-7/8}$
(c) $(\frac{x^{-1/3}}{y^{3/8}})^{-48}$
(d) $x^{-4/5}(y^{1/3} + x^{-1/5})$
(e) $(\frac{-8x^{-3}y^{12}}{z^{15}})^{-1/3}$