HOMEWORK 8 - MATH 102

DUE DATE: Friday, November 16

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) $(\frac{-8x^{-3}y^{12}}{z^{15}})^{-1/3}$