

HOMEWORK 8 - MATH 102

DUE DATE: Monday, November 20

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