

EXAM 4 - MATH 102

DATE: Tuesday, April 17

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 5 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. (a) Perform the operation $\frac{x-1}{x^2+3x+2} - \frac{x+7}{x^2+5x+6}$. (2 points)
- (b) Use long division to find the quotient and the remainder (3 points) of

$$(8x^4 - 75x^2 - 18x^3 + 46x + 121) \div (4x + 5).$$

2. (a) Solve the rational equation $\frac{x^2}{x^2-1} = 1 + \frac{1}{x+1}$. (3 points)
- (b) A carpenter can finish a job in 8 hours and another one can do it in 10 hours. How long will it take them to finish the job working together? (2 points)
3. (a) Perform the multiplication and simplify $(\sqrt{5} + 2\sqrt{3})(7\sqrt{5} - 5\sqrt{3})$ (2 points)
- (b) Rationalize the denominator $\frac{2+3\sqrt{2}}{4+\sqrt{2}}$. (3 points)
4. Solve the equation $\sqrt{x-1} - x = -3$ (5 points)
5. Perform the indicated operations and write your answers in the form $a + bi$ with a, b real numbers:
 - (a) $(-7 + \sqrt{-24}) \cdot (-3 + \sqrt{-6})$ (2 points)
 - (b) $\frac{3+5i}{1-3i}$ (3 points)