EXAM 2 - MATH 102
DATE: Friday, October 12
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. Solve, graph and write the solution set in interval notation

    (a) $\{x : -5x + 1 < -4 \text{ or } -2x + 1 > 5\}$. (3 points)

    (b) $|1 + \frac{2}{3}x| \geq 2$. (2 points)

2. (a) Let $A = \{1, 2, 3, 4, 5, 6, 7\}$ and $B = \{a, b, c, d, e, f\}$. Consider the relation R from A to B defined by $R = \{(1, b), (2, f), (4, b), (5, e), (7, d)\}$. Is R a function? Explain. (1 point) Find the domain $\text{Dom}(R)$. (1 point). Find the range $\text{Ran}(R)$. (1 point).

    (b) Find the domain of the function $f(x) = \sqrt{7x + 21}$. (2 points)

3. (a) Find the equation of the line that passes through the points $A = (-2, 10)$ and $B = (3, -5)$. (1 point) Find the equation of the line that is perpendicular to the line $\overline{AB}$ and passes through the point $C = (-1, -7)$. (2 points)

    (b) Graph the solution set of the linear inequality in 2 variables $2x - 1 \geq y$. (2 points)

4. Solve the following linear system of 2 equations in 2 variables:

$$\left\{ \begin{array}{rcrcr} 3x & + & 5y & = & -12 \\ -10x & + & 4y & = & -22 \end{array} \right\}$$

5. The number of piano, guitar and organ players combined is 46 million. The number of guitar and organ players exceeds the number of piano players by 4 million but the number of guitar players is only 2 million less than those playing piano. Find how many people play each of these instruments. Set up your variables. (1 point) Set up equations reflecting the data of the problem. (2 points) Solve the equations to get an answer to the question posed by the problem. (2 points)