Math 96 Final Exam Study Guide

Exam will consist of problems from old exams, plus at least 5 problems similar to the following:

Section 3.1

1. Solve the following system of equations. If the system does not have a unique solution, state whether it has no solution or an infinite number of solutions.
   \[ x - 2y = -10 \]
   \[ 2x + y = 0 \]

2. Solve the following system of equations. If the system does not have a unique solution, state whether it has no solution or an infinite number of solutions.
   \[ -3x + y = 5 \]
   \[ -4x + 5y = 14 \]

3. Solve the following system of equations. If the system does not have a unique solution, state whether it has no solution or an infinite number of solutions.
   \[ x - 4y = 4 \]
   \[ -2x + 8y = 8 \]

4. Solve the following system of equations. If the system does not have a unique solution, state whether it has no solution or an infinite number of solutions.
   \[ 3x - y = 2 \]
   \[ 3x + 5y = 26 \]

5. Solve the following system of equations. If the system does not have a unique solution, state whether it has no solution or an infinite number of solutions.
   \[ 3x - 17 = y \]
   \[ -4x + 3y = -26 \]

6. Solve the following system of equations. If the system does not have a unique solution, state whether it has no solution or an infinite number of solutions.
   \[ 7x + 4y = 20 \]
   \[ 4x + 3y = 10 \]

7. Solve the following system of equations. If the system does not have a unique solution, state whether it has no solution or an infinite number of solutions.
   \[ 4x + 9y = -8 \]
   \[ 6x = 22 - 5y \]
8. Solve the following system of equations. If the system does not have a unique solution, state whether it has no solution or an infinite number of solutions.
\[0.15x - 0.06y = 0.96\]
\[x + y = 12\]

9. Solve the following system of equations. If the system does not have a unique solution, state whether it has no solution or an infinite number of solutions.
\[0.3x + 0.9y = 6\]
\[0.6x - 0.7y = -8\]

10. Solve the following system of equations. If the system does not have a unique solution, state whether it has no solution or an infinite number of solutions.
\[3y = x + 6\]
\[x - 3y = -6\]

Section 3.2

11. A dairy needs 235 gallons of milk containing 4\% butterfat. How many gallons each of milk containing 6\% butterfat and milk containing 1\% butterfat must be used to obtain the desired 235 gallons?

12. Jill invested some money at 14\%. She also invested $100 more than 2 times that amount at 11\%. How much is invested at each rate if she receives $191 in interest after one year.

13. An investor bought 600 shares of stock, some at $7.00 per share and some at $1.25 per share. If the total cost was $2935, how many shares of each stock did the investor buy?

14. A grocer wants to mix two kinds of nuts. One kind sells for $2.20 per pound, and the other sells for $2.60 per pound. He wants to mix a total of 40 pounds and sell it for $2.50 per pound. How many pounds of each should he use in his new mix?

15. A cyclist travels 96 kilometers in 5 hours. For part of the trip he travels at 24 miles per hour, and for the rest of the trip he travels at 18 miles per hour. How long did he travel at 24 miles per hour?

16. Determine \(a\) and \(b\) such that the line with the equation \(ax + by = -6\) goes through the two points \((3, -4)\) and \((-12, 6)\).
17. A furniture shop refinishes cabinets. Employees use two methods to refinish cabinets. Method 1 takes 0.5 hours and the material costs $10. Method 2 takes 1.5 hours and the material costs $6. Next week, they plan to spend 185 hours in labor and $1540 in material for refinishing cabinets. How many cabinets should they plan to refinish with each method?

Section 1.4

18. Solve for $x$. If there is no solution, write “No Solution”:
   \[ |x| = 2 \]

19. Solve for $x$. If there is no solution, write “No Solution”:
   \[ |x| = \frac{3}{4} \]

20. Solve for $x$. If there is no solution, write “No Solution”:
   \[ |x - 9| = 3 \]

21. Solve for $x$. If there is no solution, write “No Solution”:
   \[ |3x + 4| = 4 \]

22. Solve for $x$. If there is no solution, write “No Solution”:
   \[ |4x - 7| + 2 = 10 \]

23. Solve for $x$. If there is no solution, write “No Solution”:
   \[ |2x - 4| - 6 = 0 \]

Section 1.4

24. Solve the inequality and write your solution in interval notation:
   \[ 13 + 4x \geq -3 \]

25. Solve the inequality and write your solution in interval notation:
   \[ 7 > 22 - 5x \]

26. Solve the inequality and write your solution in interval notation:
   \[ 5 - 4x < 13 - 2x \]

27. Solve the inequality and write your solution in interval notation:
   \[ -4x - 25 \geq 2x + 17 \]

28. Solve the inequality and write your solution in interval notation:
   \[ 9x - 35 \leq -2(4 - 6x) \]

29. Solve the inequality and write your solution in interval notation:
   \[ 10 \leq 2x + 4 \leq 16 \]
30. Solve the inequality and write your solution in interval notation:
   \[ 18 \geq 2x + 6 > -2 \]

31. Solve the inequality and write your solution in interval notation:
   \[-11 < -3x + 1 < 1 \]

32. Solve the inequality and write your solution in interval notation:
   \[ |x| < 2 \]

33. Solve the inequality and write your solution in interval notation:
   \[ |x| \geq -4 \]

34. Solve the inequality and write your solution in interval notation:
   \[ |x - 2| > 6 \]

35. Solve the inequality and write your solution in interval notation:
   \[ |x - 4| \leq 4 \]

36. Solve the inequality and write your solution in interval notation:
   \[ |x + 4| \leq -2 \]

37. Solve the inequality and write your solution in interval notation:
   \[ |3x - 3| - 9 < 0 \]

38. Solve the inequality and write your solution in interval notation:
   \[ 4|x + 1| - 8 > 40 \]

39. Solve the inequality and write your solution in interval notation:
   \[ -29 < 4|x - 1| + 3 \]

**Section 2.5**

40. Graph the linear inequality: \[ x - y > 6 \]

41. Graph the linear inequality: \[ y \leq -3x \]

42. Graph the linear inequality: \[ 2x - y \geq -6 \]

43. Graph the linear inequality: \[ y < 3 - x \]

44. Graph the linear inequality: \[ x - 2 > 0 \]

45. Graph the linear inequality: \[ 6y \leq 2x - 12 \]

46. Graph the linear inequality: \[ y - \frac{1}{3}x > 1 \]
Section 3.7

47. Graph the system of linear inequalities:
   \[ x > 5 \]
   \[ y \leq -5 \]

48. Graph the system of linear inequalities:
   \[ y < -2x + 2 \]
   \[ x \geq -3 \]

49. Graph the system of linear inequalities:
   \[ y > 2 \]
   \[ y \geq \frac{1}{2}x - 5 \]

50. Graph the system of linear inequalities:
   \[ x - 2y < -4 \]
   \[ x \geq 5 \]

51. Graph the system of linear inequalities:
   \[ 3y - 6x > 18 \]
   \[ y > -4 \]

52. Graph the system of linear inequalities:
   \[ x + 4y < -4 \]
   \[ x - y \geq 0 \]

53. Graph the system of linear inequalities:
   \[ y > 2x + 3 \]
   \[ x + y \geq 3 \]

54. Graph the system of linear inequalities:
   \[ 2y - 5x < 0 \]
   \[ 3y + 6x \geq -21 \]

55. Graph the system of linear inequalities:
   \[ y \leq -2x + 3 \]
   \[ y > 4x - 5 \]

56. Graph the system of linear inequalities:
   \[ y \leq 3x \]
   \[ y < 3x + 3 \]
Section 7.6

57. Solve the inequality and write your solution in interval notation:
\((x - 7)(x + 3) \geq 0\)

58. Solve the inequality and write your solution in interval notation:
\((3x - 4)(x + 1) < 0\)

59. Solve the inequality and write your solution in interval notation:
\(x^2 - 4x - 5 < 0\)

60. Solve the inequality and write your solution in interval notation:
\(-x^2 - 8x > 15\)

61. Solve the inequality and write your solution in interval notation:
\(x^3 - 6x^2 \geq -8x\)

62. Solve the inequality and write your solution in interval notation:
\(x^3 + 8x^2 + 16x < 0\)

63. Solve the inequality and write your solution in interval notation:
\(8x^2 + 3 > x\)

64. Solve the inequality and write your solution in interval notation:
\((x + 2)^2 - 4 \geq 0\)

65. Solve the inequality and write your solution in interval notation:
\(\frac{x - 5}{3x} \leq 0\)

66. Solve the inequality and write your solution in interval notation:
\(\frac{x - 1}{x + 5} > 0\)

67. Solve the inequality and write your solution in interval notation:
\(\frac{3x - 2}{x - 6} \geq 0\)

68. Solve the inequality and write your solution in interval notation:
\(\frac{(x + 7)(x - 1)}{x - 5} < 0\)