Math 199
Fall, 2005
Quiz 8 - §3.3

Name: **Solutions**(Yellow)

Circle the letter corresponding to your answer. Circle only one answer per question. There is no partial credit on this portion of the quiz.

1. The system of equations

$$x - 3y + 3z = 7$$
$$x + 2y - z = -2$$
$$5x + 5y - 7z = 5$$

is

A. dependent

B. independent

C. inconsistent

D. purple

E. None of the above

Using the calculator this reduces to

$$\left(\begin{array}{ccc|c} 1 & 0 & 0 & 2.2 \\ 0 & 1 & 0 & -2.6 \\ 0 & 0 & 1 & -1 \end{array}\right)$$

This means that

$$x = 2.2$$
$$y = -2.6$$
$$z = -1$$

which is an independent system, so the answer is B.

For the next problem, show all work to receive full credit. No Work = No Credit.

2. A trust account manager has \$200,000 to be invested. The investment choices have current yields of 8%, 7%, and 10%. Suppose that the investment goal is to earn interest of \$16,000, and risk factors make it prudent to invest some money in all three investments. What amount should be invested at each rate?

Let x = amount invested at 8%

Let y =amount invested at 7%

Let z =amount invested at 10%

The equations are

$$x + y + z = 200,000$$

$$.08x + .07y + .1z = 16,000$$

Using the matrix:

$$\left(\begin{array}{ccc|c} 1 & 1 & 1 & 200,000 \\ .07 & .08 & .1 & 16,000 \end{array}\right)$$

and the calculator gives us

$$\left(\begin{array}{ccc|c} 1 & 0 & 3 & 200,000 \\ 0 & 1 & -2 & 0 \end{array}\right)$$

which translates to

$$x + 3z = 200,000$$

$$y - 2z = 0$$

Therefore they can invest any amount, z at 10% and then invest $2z$ at 7%, and $200,000 - 3z$ at 8%.

For instance, they can invest \$170,000 at 8%, \$20,000 at 7%, and \$10,000 at 10%.

Or \$155,000 at 8%, \$30,000 at 7%, and \$15,000 at 10%.