

---

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

$$2x - 5y + z = -9$$

$$x + 4y - 6z = 2$$

$$3x - 4y - 2z = -10$$

is

A. dependent

B. independent

C. inconsistent

D. purple

E. None of the above

Using the calculator this reduces to

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

This means that

$$x - 2y = -2$$

$$y - z = 1$$

which is a dependent system, so the answer is A.

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%.