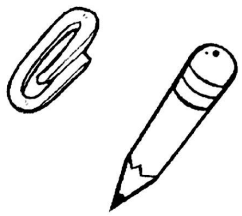
College Algebra **Name** Nomani

Intro to 7.3- Solving systems using Matrices **Period:** _____ **Date:** _____

For each of the problems, define the variables you would use and set up a system using those variables to solve the problem.

1.) Avery and Mead went to an office supplies store to buy paper clips and pencils. Avery bought 15 boxes of paper clips and 7 packages of pencils, while Mead bought 12 boxes of paper clips and 10 packages of pencils. If Avery spent $55.40 and Mead spent $61.70, how much does a box of paper clips and a package of pencils cost?



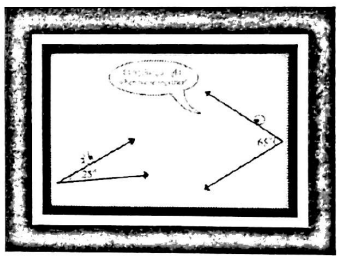
Define variables: x: paper clips
y: pencils

System:

$15x + 7y = 55.40$
$12x + 10y = 61.70$ $\rightarrow \begin{bmatrix} 15 & 7 \\ 12 & 10 \end{bmatrix}^{-1} \begin{bmatrix} 55.40 \\ 61.70 \end{bmatrix} = \begin{bmatrix} 1.85 \\ 3.95 \end{bmatrix}$

$x = \$1.85,\ y = \$3.95$

2.) Two angles are complementary. One angle is 81° less than twice the other angle. Find the measure of each angle.



Define variables: x: 1st angle
y: 2nd angle

System:

$x + y = 90°$
$x = 2y - 81° \rightarrow x - 2y = -81°$ $\rightarrow \begin{bmatrix} 1 & 1 \\ 1 & -2 \end{bmatrix}^{-1} \begin{bmatrix} 90 \\ -81 \end{bmatrix} = \begin{bmatrix} 33 \\ 57 \end{bmatrix}$

$x = 33°,\ y = 57°$

3.) Margie needs to buy a week's supply of medication for 24 dogs and 164 cats at a local shelter. The medication for each dog costs twice as much as the medication for a cat. If her budget is $4,240, how much can Margie spend on medication for each dog?

Define variables: d = dogs
c = cats

System:

$24d + 164c = 4240$
$d = 2c \rightarrow d - 2c = 0$

$\begin{bmatrix} 24 & 164 \\ 1 & -2 \end{bmatrix}^{-1} \begin{bmatrix} 4240 \\ 0 \end{bmatrix} = \begin{bmatrix} 40 \\ 20 \end{bmatrix}$

$d = \$40$
$c = \$20$

4.) Farmer Bob houses a total of 13 pigs and chickens. A total of 40 feet can be counted among these pigs and chickens. How many of the animals are pigs, and how many are chickens?

Define variables: p: pigs
c: chickens

System: $p + c = 13$
$4p + 2c = 40$ $\rightarrow \begin{bmatrix} 1 & 1 \\ 4 & 2 \end{bmatrix}^{-1} \begin{bmatrix} 13 \\ 40 \end{bmatrix} = \begin{bmatrix} 7 \\ 6 \end{bmatrix}$

7 pigs, 6 chickens

5.) Seventy-eight tickets were sold for a private Taylor Swift concert. If $483 was collected and seats cost either $2.50 or $10.50, how many of each were sold?

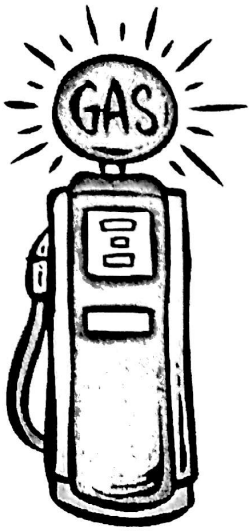
Define variables: c: cheap seats
e: expensive seats

System: $c + e = 78$
$2.50c + 10.50e = 483$

42 cheap seats, 36 expensive seats

6.) During a trip to the gas station you fill your vehicle with 15 gallons of premium gasoline and a 5 gallon gas can with regular gasoline. The price of premium gasoline is 25 cents greater than the price of regular gasoline. If you pay a total of $76.75, what is the price per gallon of regular and premium gasoline?

Define variables: p: premium price
r: regular price



System: $15p + 5r = 76.75$
$p = r + 0.25 \rightarrow p - r = 0.25$

p: $3.90, r: $3.65