Name

DIRECTIONS: SHOW ALL WORK AND SET UPS FOR FULL CREDIT!

Solve the system algebraically.

1) $y = x^3 + x^2$
$y = -5x^2$

$-5x^2 = x^3 + x^2$

$0 = x^3 + 6x^2$

$0 = x^2(x+6)$

$x = 0$ or $x + 6 =$

$y = -5(0)^2 = 0$

$(0,0)$

$x = -6$

$y = -5(-6)^2$

$= -180$

$(-6, -180)$

Solve the system by elimination.

2) $7x - 20 = 8y$
$2x - 3y = 10$

$-2(7x - 8y = 20)$ $\quad -14x + 16y = -40$

$7(2x - 3y = 10)$ $\quad 14x - 21y = 70$

$-5y = 30$

$y = -6$

$2x + 18 = 10$

$2x =$ [redacted] -8

$x =$ [redacted] -4

[redacted] $(-4, -6)$

Find the inverse of A by hand if it has one, or state that the inverse does not exist. Show all work. [2

3) $A = \begin{bmatrix} 0 & -6 \\ -4 & 6 \end{bmatrix}$

$\det A = 0 - 24 = -24$

$A^{-1} = \frac{1}{-24}\begin{bmatrix} 6 & 6 \\ 4 & 0 \end{bmatrix} = \begin{bmatrix} -\frac{6}{24} & -\frac{6}{24} \\ -\frac{4}{24} & 0 \end{bmatrix} = \begin{bmatrix} -\frac{1}{4} & -\frac{1}{4} \\ -\frac{1}{6} & 0 \end{bmatrix}$

Solve the problem. Use your graphing calculator. [1]

4) Find the market equilibrium for the given supply and demand functions. Here y represents price and x represents quantity.
$y = 2600 - 90x$ (demand)
$y = 110x$ (supply)

$2600 - 90x = 110x$

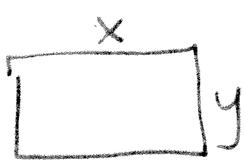
$2600 = 200x$

$13 = x$ $\qquad y = 110 \cdot 13 = 1430$

Quantity 13
price \$1430

Solve.

5) Find the dimensions of a rectangular enclosure with perimeter 40 yd and area 91 yd^2.



$\boxed{2x + 2y = 40}$ $\rightarrow$ $x + y = 20$ $\rightarrow$ $y = 20 - x$

$\boxed{x \cdot y = 91}$ $\rightarrow$ $y = \frac{91}{x}$

put in calc $y_1 = 20 - x$ $\quad y_2 = \frac{91}{x}$
and find intersection $\boxed{13\text{yds} \times 7\text{yds}}$

Answer the question.

6) $2x - 7y = -17$
$5x + 3y = 19$

If your friend was going to solve this system of equations by first eliminating y, what general suggestions would you make so your friend could start on this in a systematic way?

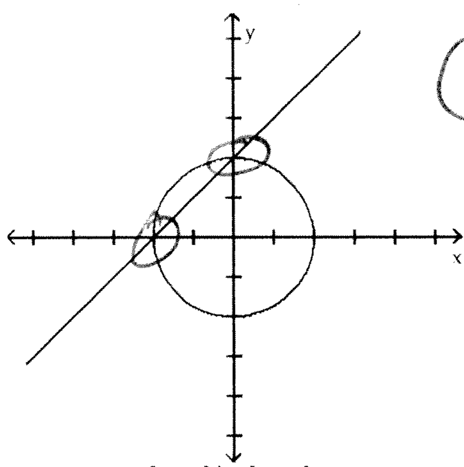
Multiply one or both equations by a number that would eliminate either x or y

7) If the graphs of a system of two equations are a line and a parabola, what are the possible numbers of solutions (with real coordinates) of this system?

2 or 0 or 1

Use the graph to estimate any solutions of the system.

8) $x^2 + y^2 = 4$
$y = 2 + x$



[-5, 5] by [-5, 5]

(0,2) (-2,0)

Find the matrix product, if possible. Show all steps by hand. [2]

9) $\begin{bmatrix} 8 & 5 & -6 \\ 9 & 2 & -1 \end{bmatrix} \begin{bmatrix} -3 \\ 5 \\ 5 \end{bmatrix}$

$r_1 \times c_1 = -24 + 25 - 30 = -29$

$r_2 \times c_1 = -27 + 10 - 5 = -22$

$\begin{bmatrix} -29 \\ -22 \end{bmatrix}$

Find a matrix A and a column matrix B that describe the following tables involving credits and tuition costs. Find the matrix produc AB, and interpret the significance of the entries of this product. [2]

10)

Credits	College A	College B
Student 1	6	9
Student 2	6	6

Cost	Tuition
College A	\$86
College B	\$65

$$\overset{A}{\begin{bmatrix} 6 & 9 \\ 6 & 6 \end{bmatrix}} \cdot \overset{B}{\begin{bmatrix} \$86 \\ \$65 \end{bmatrix}} = \begin{bmatrix} \$1101 \\ \$906 \end{bmatrix}$$

Student 1's college tuition @ both colleges is \$1101. Student 2's tuition total = \$906.

Solve the problem.

11) The total number of cars sold at a used car lot for the years 1996 and 1997 was 688. The number of cars sold in 1997 was 3 times the number of cars sold in 1996. How many cars were sold in 1997?

x = cars sold 1996

y = cars sold in 1997

$\boxed{\text{172 cars in 1996} \\ \text{516 cars in 1997}}$

$x + y = 688$

$y = 3x$

$x + 3x = 688$

$\frac{4x}{4} = \frac{688}{4}$

$x = 172$

$y = 516$