DO NOT TURN THIS PAGE UNTIL YOU ARE INSTRUCTED TO DO SO

❖ Write your name below on the space provided.
❖ This test has a total of 6 pages.
❖ Work the problem in the space provided. If you need more space, write on the back of the test.
❖ To insure maximum credit, show your work. In general, full credit will not be given for unsupported answers.
❖ Look only at your test. Don't give me the impression that you are cheating.
❖ Be sure to write neatly. If I cannot read what was written, do not expect the problem to be graded.
❖ If you finish early, go over the test again.

Good luck!

Number	Maximum	Score
1	4	
2	20	
3	6	
4	12	
5	12	
6	18	
7	1	
8	7	
9	6	
10	4	
11	10	
Total	100	

Name _____

circle final answers

1) (4 points) Find the equation of the line in slope-intercept form that passes through the points $(5,-3)$ and $(7,4)$:

2) (4 points each) It was found that the price and demand for a Cactar plushie can be given by $p = D(q) = 138 - 1.23q$ where p is price in dollars and q is the demand in hundreds of plushies.

Suppose that the price and supply (in hundreds of plushies) is given by $p = S(q) = 1.27q$.

Rounding answer to the nearest whole number...

a) Find and interpret, using the language of the problem, the following.

   i) $D(60)$ ii) $S(26)$

b) Find the demand when the price is $42.50:   c) Find the supply when the price is $42.50:

d) Find the equilibrium quantity and equilibrium price:

3) (2 points each) Short answer: In your own words, describe the formula for the…
a) Cost Function: b) Revenue Function: c) Profit Function:

4) (4 points each) Mary buys a Cricut cutting machine for $420.25 and plans to make custom aprons
   to sell with the machine. Each apron costs $12.50 to make and she plans to sell them for $22.75
   each.
a) Write and label the corresponding Revenue, Cost, and Profit functions for this problem:

b) How many aprons must be sold to break
   even?

c) If they sell 5 aprons a week, **during** which
   week will she be able to break even?

5) (3 points each) Consider the following data (source: Census.gov):

Year	2010	2011	2012	2013	2014	2015	2016
Percentage of people 25 years or older that have completed 4 years of college or more	29.9	30.4	30.9	31.7	32.0	32.5	33.4

Let x be the number of years since 2010 and let y be the percentage of people 25 years or older
that have completed 4 years of college or more.
a) Find the equation of the regression line. Round values to two decimal places:

b) Interpret the slope and y-intercept using the language of the problem:

c) Predict the percentage of people that
completed more than 4 years in the year 2018:

d) When will 40% of people 25 or older have
completed 4 or more years of college?

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6) (9 points each) Solve the given system using the methods listed below. Write answer as an ordered triple.
a) The Echelon (Elimination) method:

$$\begin{cases} x - 4y + 2z = -4 \\ 4x - 15y + 8z = 2 \\ -2x + 9y - 10z = 8 \end{cases}$$

b) Gauss-Jordan method:

7) (1 point) Verify that you made absolutely sure that your answer to 6a is the same as in 6b by signing your name here _____. You will not receive the credit if the work does not support the same answer.

8) For the following problem:

A movie theater charges $9.00 for an adult ticket, $7.00 for seniors, and $6.00 for a child's ticket. For the movie *Tom Hanks presents Tom Hanks as Tom Hanks*, the theater sold a total of 290 tickets, which brought in $2400. The number of adult tickets sold was twice the number of children's tickets sold. How many tickets were sold to adults, to children, and to seniors?

a) (2 points) Name and define your variables for this problem:

b) (5 points) Set up **BUT DO NOT SOLVE** a system of equations for this problem:

9) (3 points each) For the matrices $A = \begin{bmatrix} 3 & 2 & 3 \\ -1 & 1 & -2 \\ 0 & 4 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 0 & 2 \end{bmatrix}$, and $C = \begin{bmatrix} 4 & 1 & 2 \end{bmatrix}$, find

the following, if possible. If not possible, explain why:

a) $4B + 5C$ b) CA

10) (2 points each) What property must be true to…
a) Add or subtract matrices?   b) Multiply matrices?

11) (6 points part *a*; 4 points part *b*) For the system $\begin{cases} 3x - 8y = 20 \\ -x + 6y = 10 \end{cases}$ ...

a) Find the inverse of the coefficient matrix algebraically using the Gauss-Jordan Method:

b) Solve the system using the matrix inverse from part *a*: