

MATH 141

Name: _____

Exam I Review Activity

- Find the x and y -intercepts for the line $2x + 5y = 7$.
- Solve the following system of equations. If the solution is parametric, give both the parametric solution, as well as one specific solution.

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

$$3x + 5y - 6z = 10$$

- Tom buys a camera for \$500. The camera has a scrap value of \$50 after 5 years. How long will it be before the camera is valued at \$400 if the camera depreciates linearly?
- Solve the following matrix equation for X : $AX + B = C - X$

- The table below gives the annual credit card sales (in thousands of dollars) at a local “mom ’n pop” store during the given years.

Year	2000	2002	2005	2009
Sales	5.2	6.0	7.5	8.2

- Determine the equation of the least-squares line for this data, letting x represent the number of years since 2000. Round each coefficient/constant to four decimal places, if necessary.
- Is the least-squares line a good representation of the data? Why or why not?
- Use your unrounded model to determine sales (to the nearest dollar) in the year 2010.
- Use your unrounded model to determine the year when sales will first reach \$10,500, assuming this trend continues.

- Two bakeries, Breakfast Haven and Sunny Bakery, make both doughnuts and kolaches. Matrix A gives the time (in minutes) to make each product at each bakery. Matrix B shows the orders of doughnuts and kolaches two companies, C and D , place one morning.

$$A = \begin{array}{c} \text{Doughnuts} \\ \text{Kolaches} \end{array} \begin{array}{cc} \text{BreakfastHaven} & \text{SunnyBakery} \\ \left[\begin{array}{cc} 5 & 6 \\ 10 & 8 \end{array} \right] \end{array}$$

$$B = \begin{array}{c} \text{CompanyC} \\ \text{CompanyD} \end{array} \begin{array}{cc} \text{Doughnuts} & \text{Kolaches} \\ \left[\begin{array}{cc} 50 & 60 \\ 75 & 40 \end{array} \right] \end{array}$$

Give the meaning of the entries, if any exists, in the matrix products, AB and BA .

7. Fill in the blanks in the following sentences with either “the same” or “different”.

- (a) A system of two linear equations in two variables with no solution means the two lines have _____ slopes and _____ y -intercepts.
- (b) A system of two linear equations in two variables with infinitely many solutions means the two lines have _____ slopes and _____ y -intercepts.

8. Using the variables defined as a = the number of apples, b = the number of bananas, and c = the number of carrots, write an equation for each of the following statements.

- (a) Susie bought as many carrots as apples and bananas combined.
- (b) Mark bought three times as many bananas as apples.
- (c) Bugs ate ten more carrots than he did apples.

9. A book company can produce 100 books at a total cost of \$800 and 150 books at a total cost of \$900. The books retail for \$7.50 each.

- (a) Exactly how many books must be made and sold for the company to break-even?
- (b) Is this amount possible for the company to “truly” break-even? Why or why not?

10. Given the matrix equation below, solve for a , b , c and d .

$$\begin{bmatrix} a & 0 \\ 1 & 5 \end{bmatrix}^T + 2 \begin{bmatrix} 4 & 5 \\ 6 & 7 \end{bmatrix}^{-1} = \begin{bmatrix} 3 & b \\ c & d \end{bmatrix}$$

11. Cookies are being sold at a fair. It is found that 50 cookies can be sold at \$0.75 each, but for each 10 cent increase in price per cookie, 5 less cookies will be bought.

- (a) Find the linear demand function for the cookies, $p(x)$, where x represents the number of cookies sold and price is in dollars.
- (b) How many cookies would be taken (to the nearest cookie) if they were given away for free?
- (c) If the supply equation for these cookies is known to be $p(x) = \frac{1}{100}x + 0.10$, find the equilibrium point for the market.

12. Given the augmented matrix below, answer the questions that follow.

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 8 \\ 0 & 1 & 4 & 7 \\ 0 & -2 & 3 & 5 \end{array} \right]$$

- (a) Is this matrix in reduced row-echelon form?
- (b) Perform the following row operation ($2R_2 + R_3 \rightarrow R_3$) and give the resulting matrix.