

## COLLEGE ALGEBRA QUIZ

- (1) Is the following statement, true or false?  
In general, matrix addition is commutative.

True

- (2) Is the following statement, true or false?  
for any  $a \times b$  matrix,  $\mathbf{A}$  and  $\mathbf{B}$ ,  $\mathbf{A} \cdot \mathbf{B} = \mathbf{B} \cdot \mathbf{A}$ .

False

- (3) The following table lists the number of unemployed persons in the United States, represented in terms of the number of years after 2008.

Year, x	Unemployed Persons (in thousands)
2008, 0	7990
2012, 4	12700
2016, 6	7529

- (a) Use a system of equations to fit a quadratic function,  $f(x) = ax^2 + bx + c$ , to the data. Round to the nearest whole number.

$$f(x) = -627x^2 + 3686x + 7990$$

- (b) Use the function to estimate the number of persons unemployed in 2010.

12854 thousand people

- (4) Given the following matrices,

$$\mathbf{A} = \begin{vmatrix} 0 & 3 & 4 \\ 4 & 1 & 0 \\ 2 & 4 & 3 \end{vmatrix} \quad \mathbf{B} = \begin{vmatrix} 3 & 3 & 4 \\ 2 & 0 & 2 \\ 3 & 3 & 3 \end{vmatrix} \quad \mathbf{C} = \begin{vmatrix} 1 & 1 \\ 2 & 0 \end{vmatrix}$$

Find:

- (a)  $\mathbf{A} + \mathbf{B}$

$$\mathbf{A} + \mathbf{B} = \begin{vmatrix} 3 & 6 & 8 \\ 6 & 1 & 2 \\ 5 & 7 & 6 \end{vmatrix}$$

- (b)  $\mathbf{A} - \mathbf{B}$

$$\mathbf{A} - \mathbf{B} = \begin{vmatrix} -3 & 0 & 0 \\ 2 & 1 & -2 \\ -1 & 1 & 0 \end{vmatrix}$$

- (c)  $\mathbf{AB}$

$$\mathbf{AB} = \begin{vmatrix} 18 & 12 & 18 \\ 14 & 12 & 18 \\ 23 & 15 & 25 \end{vmatrix}$$

(d)  $\mathbf{B} + \mathbf{C}$ 

Undefined

(e)  $-3\mathbf{C}$ 

$$-3\mathbf{C} = \begin{vmatrix} 2 & 2 \\ 4 & 0 \end{vmatrix}$$

- (5) The following table lists the cost per serving, in dollars, for items on four menus at a business conference.

Menu	Grains	Vegetables	Fruits	Dairy	Meat	Beans
1	0.86	0.26	0.17	0.63	2.68	0.39
2	0.53	0.31	0.84	0.76	3.80	0.55
3	0.53	0.51	0.35	0.52	2.52	0.03
4	0.60	0.28	0.60	0.50	1.26	0.68

For a particular event, a business orders 27 meals from menu 1, 35 meals from menu 2, 17 meals from menu 3, and 40 meals from menu 4.

- (a) Write the information in the table as a  $4 \times 6$  matrix  $\mathbf{B}$ .

$$\mathbf{B} = \begin{vmatrix} 0.86 & 0.26 & 0.17 & 0.63 & 2.68 & 0.39 \\ 0.53 & 0.31 & 0.84 & 0.76 & 3.80 & 0.55 \\ 0.53 & 0.51 & 0.35 & 0.52 & 2.52 & 0.03 \\ 0.60 & 0.28 & 0.60 & 0.50 & 1.26 & 0.68 \end{vmatrix}$$

- (b) Write a row matrix  $\mathbf{C}$  that represents the number of each menu ordered.

$$\mathbf{C} = [27 \quad 35 \quad 17 \quad 40]$$

- (c) Compute the product  $\mathbf{CB}$ , which represents the total cost, in dollars, for each item for the day's meals.

$$\mathbf{CB} = [74.78 \quad 37.74 \quad 63.94 \quad 72.45 \quad 298.60 \quad 57.49]$$

- (6) What is the matrix equation equivalent to this system of equations:

$$6x + 4y + z = 17$$

$$-x + 7y + z = 16$$

$$x + 5y + 7z = 32$$

$$\begin{vmatrix} 6 & 4 & 1 \\ -1 & 7 & 1 \\ 1 & 5 & 7 \end{vmatrix} \begin{vmatrix} x \\ y \\ z \end{vmatrix} = \begin{vmatrix} 17 \\ 16 \\ 32 \end{vmatrix}$$