EOC Review #9

Name: Date:
Teacher: Class/Period:

1) This table shows data from a geometry investigation.

x	4	5	6	7
y	2	5	9	14

If y is a quadratic function of x, which matrix equation could be used to find the equation of y?

quadratics: ax^2+bx+c

compare each choice with data in table

A. $\begin{bmatrix}16 & 4 & 1\\ 25 & 5 & 1\\ 49 & 7 & 1\end{bmatrix}\begin{bmatrix}a\\ b\\ c\end{bmatrix}=\begin{bmatrix}2\\ 5\\ 14\end{bmatrix}$

B. $\begin{bmatrix}16 & 4 & 1\\ 25 & 5 & 1\\ 49 & 7 & 1\end{bmatrix}\begin{bmatrix}a\\ b\\ c\end{bmatrix}=\begin{bmatrix}2\\ 5\\ 9\end{bmatrix}$

C. $\begin{bmatrix}4 & 4 & 1\\ 5 & 5 & 1\\ 7 & 7 & 1\end{bmatrix}\begin{bmatrix}a\\ b\\ c\end{bmatrix}=\begin{bmatrix}2\\ 5\\ 9\end{bmatrix}$

D. $\begin{bmatrix}16 & 4 & 0\\ 25 & 5 & 0\\ 49 & 7 & 0\end{bmatrix}\begin{bmatrix}a\\ b\\ c\end{bmatrix}=\begin{bmatrix}2\\ 5\\ 14\end{bmatrix}$

2) Three friends went shopping at their favorite store. All the pants, shirts, and sweaters were on sale, and articles of each type cost the same. The table shows the friends' purchases.

Clothing Purchases and Costs				
	# of pants	# of shirts	# of sweaters	Total cost
Alicia	5	5	2	$377
Bette	5	6	0	$322
Cara	3	7	3	$408

matrix in calc rref

Using the information in the table, determine the cost of each sweater.

A. $20.90
B. $32.00
C. $41.00
D. $45.45

3) If D, E, F, and X are 2 x 2 matrices, with

$D=\begin{bmatrix}2 & -1\\ 3 & 5\end{bmatrix}$

$E=\begin{bmatrix}3 & -1\\ 0 & 6\end{bmatrix}$

$F=\begin{bmatrix}2 & 1\\ -3 & 0\end{bmatrix}$

and $DX+E=F$, what is X?

F - E in calc

$DX=\begin{bmatrix}-1 & 2\\ -3 & -6\end{bmatrix}$

$\begin{bmatrix}2 & -1\\ 3 & 5\end{bmatrix}X=\begin{bmatrix}-1 & 2\\ -3 & -6\end{bmatrix}$

↳ can find inverse and multiply to the other side, but must be on the left.

A. $\begin{bmatrix}1 & 10\\ -15 & -24\end{bmatrix}$

B. $\begin{bmatrix}-\frac{5}{4} & -\frac{1}{4}\\ -\frac{1}{4} & -\frac{11}{4}\end{bmatrix}$

C. $\begin{bmatrix}-\frac{8}{13} & \frac{4}{13}\\ -\frac{3}{13} & -\frac{18}{13}\end{bmatrix}$

D. $\begin{bmatrix}-\frac{9}{52} & -\frac{11}{156}\\ \frac{2}{13} & \frac{1}{39}\end{bmatrix}$

4) What is AB?

$A=\begin{bmatrix}-3 & 1\\ 6 & 0\\ 4 & 2\\ 9 & 7\end{bmatrix}$ $B=\begin{bmatrix}2 & 6\\ 5 & 1\end{bmatrix}$

plug in calc.

A. $\begin{bmatrix}52 & 156\\ 130 & 26\end{bmatrix}$

B. $\begin{bmatrix}-1 & -17\\ 12 & 36\\ 18 & 26\\ 53 & 61\end{bmatrix}$

C. $\begin{bmatrix}-6 & 6\\ 30 & 0\\ 8 & 12\\ 45 & 7\end{bmatrix}$

D. $\begin{bmatrix}-42 & 14\\ 84 & 0\\ 56 & 28\\ 126 & 98\end{bmatrix}$

5) Find the inverse of $\begin{bmatrix} 3 & 2 \\ 4 & 1 \end{bmatrix}$.

A. $\begin{bmatrix} 1 & -2 \\ -4 & 3 \end{bmatrix}$

B. $\begin{bmatrix} \frac{3}{5} & -\frac{4}{5} \\ -\frac{2}{5} & \frac{1}{5} \end{bmatrix}$

C. $\begin{bmatrix} -5 & 10 \\ 20 & -15 \end{bmatrix}$

D. $\begin{bmatrix} -\frac{1}{5} & \frac{2}{5} \\ \frac{4}{5} & -\frac{3}{5} \end{bmatrix}$

plug in calc $[A]^{-1}$

6) Four teams participate in a math competition. The number of 1st, 2nd, 3rd, and 4th place finishes in each round determines the final score. This matrix shows the results of all 10 rounds of this competition.

	1st	2nd	3rd	4th
Team 1	3	4	1	2
Team 2	2	3	3	2
Team 3	4	1	1	4
Team 4	1	2	5	2

Teams earn 4 points for each 1st place finish, 3 points for 2nd place finishes, 2 points for 3rd place finishes, and 1 point for 4th place finishes. Which teams tie for 2nd place?

A. 1 and 2
B. 2 and 3
C. 3 and 4
D. 4 and 1

7) For Matrix B to be the inverse of Matrix A, what must be the value of x in Matrix B?

$A = \begin{bmatrix} \frac{1}{5} & \frac{3}{10} \\ \frac{2}{5} & \frac{1}{10} \end{bmatrix}$ $B = \begin{bmatrix} x & 3 \\ 4 & -2 \end{bmatrix}$

A. −8
B. −6
C. −3
D. −1

plug in calc $[A]^{-1}$

12) The matrix $\begin{bmatrix} (x-2) & (x-2)^2 \\ (x+3) & (x+3)^3 \end{bmatrix}$ will NOT have an inverse for which nonnegative value of x?

A. 0
B. 1
C.
D. 3

det. = 0, no inverse
find value that makes 1 row or column = 0.
can plug each # in to calc and $[A]^{-1}$

8) Solve for x.

$$\begin{bmatrix} 25 & -8 \\ 4x & 0 \end{bmatrix} + \begin{bmatrix} 5 & 1 \\ x & 3 \end{bmatrix}\begin{bmatrix} -4 & 1 \\ 2 & -3 \end{bmatrix} = \begin{bmatrix} 7 & -6 \\ 6 & x^2 \end{bmatrix}$$

A. −9, 3
B. $\frac{-1 \pm \sqrt{37}}{2}$
C. $\frac{5 \pm i\sqrt{11}}{2}$
D. $\frac{1 \pm i\sqrt{35}}{2}$

9) If A is a 3×2 matrix, B is a 3×3 matrix, and C is a 2×3 matrix, what are the dimensions of $A \times C \times B$?

A. 3×3
B. 2×2
C. 2×3
D. 18×18

A·C
(3x2)(2x3) B
A·C
(3x3) (3x3)
(3x3)

10) A used bookstore sells paperback books for $1.00 each, hardback books for $3.00 each, and CDs for $4.00 each. On Saturday, they sold 37 paperbacks, 52 hardbacks, and 42 CDs. What matrix operation would compute the store's total income for that day?

A. $[\$1.00 \quad \$3.00 \quad \$4.00]\begin{bmatrix} 37 \\ 52 \\ 42 \end{bmatrix}$

B. $[\$1.00 \quad \$3.00 \quad \$4.00][37 \quad 52$

C. $\begin{bmatrix} 37 \\ 52 \\ 42 \end{bmatrix}[\$1.00 \quad \$3.00 \quad \$4.00]$

D. $\begin{bmatrix} 37 \\ 52 \\ 42 \end{bmatrix}\begin{bmatrix} \$1.00 \\ \$3.00 \\ \$4.00 \end{bmatrix}$

11) Find the values of x and y for this matrix equation:

$$\begin{bmatrix} x & 5 & 7 \\ 2 & 8 & 4 \end{bmatrix}\begin{bmatrix} 1 & 3 \\ y & 2 \\ 5 & 6 \end{bmatrix} = \begin{bmatrix} 68 & 61 \\ 70 & 46 \end{bmatrix}$$

A. $x = 19, y = -2$
B. $x = 18, y = 2$
C. $x = 3, y = 6$
D. $x = -2, y = 5$

Guess & check

17) What is the inverse of $\begin{bmatrix} 2 & 1 & -1 \\ -2 & 2 & 2 \\ -1 & 2 & 1 \end{bmatrix}$?

[A]$^{-1}$

A. $\begin{bmatrix} 1 & 1.5 & 2 \\ 0 & -0.5 & 1 \\ 1 & 2.5 & -3 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 1.5 & -2 \\ 0 & -0.5 & 1 \\ 1 & 2.5 & -3 \end{bmatrix}$

B. $\begin{bmatrix} 1 & -1.5 & 2 \\ 0 & 1.5 & -1 \\ -1 & 2.5 & 3 \end{bmatrix}$

D. $\begin{bmatrix} 0 & 1.5 & -2 \\ 1 & -0.5 & 1 \\ 0 & 2.5 & -3 \end{bmatrix}$

18) Given $A = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ and $B = [6 \quad 0 \quad -3]$, what is AB?

[A] · [B] in calc

A. $[-3]$

C. $\begin{bmatrix} 1 & 6 \\ 2 & 0 \\ 3 & -3 \end{bmatrix}$

B. $\begin{bmatrix} 6 \\ 0 \\ 9 \end{bmatrix}$

D. $\begin{bmatrix} 6 & 0 & -3 \\ 12 & 0 & -6 \\ 18 & 0 & -9 \end{bmatrix}$

14) Evaluate $\begin{vmatrix} 4 & 9 \\ 3 & -6 \end{vmatrix}$.

Determinant plug in calc.

A. −51
B. −3
C. 3
D. 54

15) Evaluate $\begin{vmatrix} 2 & 1 & 4 \\ 0 & 0 & 5 \\ 3 & -3 & 2 \end{vmatrix}$.

Determinant plug in calc.

A. −15
B. 14
C. 15
D. 45

19) Matrix A represents the amount of fruit, in pounds, Juanita purchased on 3 different trips to a store. Matrix B gives the price per pound of each type of fruit.

Plug in [A] · [B]

$$A = \begin{bmatrix} \text{oranges} & \text{pears} & \text{grapes} \\ 6 & 7 & 2 \\ 12 & 5 & 1 \\ 18 & 0 & 3 \end{bmatrix}$$

$$B = \begin{bmatrix} \text{oranges} & \$0.50 \\ \text{pears} & \$2.00 \\ \text{grapes} & \$2.25 \end{bmatrix}$$

What matrix gives the amount Juanita spent on each trip?

A. $\begin{bmatrix} \$18.00 \\ \$24.00 \\ \$13.50 \end{bmatrix}$

B. $\begin{bmatrix} \$21.50 \\ \$18.25 \\ \$15.75 \end{bmatrix}$

C. $\begin{bmatrix} \$71.25 \\ \$85.50 \\ \$99.75 \end{bmatrix}$

D. $\begin{bmatrix} \$3.00 & \$3.50 & \$1.00 \\ \$24.00 & \$10.00 & \$2.00 \\ \$40.50 & \$0.00 & \$6.75 \end{bmatrix}$

16) What is the inverse of this matrix?

$$\begin{bmatrix} 3 & 4 \\ -1 & -2 \end{bmatrix}$$

[A]$^{-1}$

A. $\begin{bmatrix} \frac{1}{3} & \frac{1}{4} \\ -1 & -\frac{1}{2} \end{bmatrix}$

C. $\begin{bmatrix} 1 & 2 \\ -\frac{1}{2} & -\frac{3}{2} \end{bmatrix}$

B. $\begin{bmatrix} -\frac{1}{3} & -\frac{1}{4} \\ 1 & \frac{1}{2} \end{bmatrix}$

D. $\begin{bmatrix} -\frac{3}{2} & -2 \\ \frac{1}{2} & 1 \end{bmatrix}$

20) Ashok, Kiri, and Justin designed 3 computer games, x, y, and z. They have sold some games and want to expand their business by advertising on the Internet. This matrix gives their sales for the first month.

$$\begin{matrix} x \\ y \\ z \end{matrix}\begin{bmatrix} 13 \\ 9 \\ 22 \end{bmatrix}$$

Their goal is to double the number of games sold each month for the next 4 months. What matrix represents their goal?

A. $\begin{bmatrix} 26 \\ 18 \\ 44 \end{bmatrix}$

B. $\begin{bmatrix} 104 \\ 72 \\ 176 \end{bmatrix}$

(C.) $\begin{bmatrix} 208 \\ 144 \\ 352 \end{bmatrix}$

D. $\begin{bmatrix} 52 \\ 36 \\ 88 \end{bmatrix}$

double for 4 months

$2^4 = 16$

multiply each element by 16

21) Given:

$\begin{cases} Ax + By = p \\ Cx + Dy = q \end{cases}$ is a system of linear equations

such that $\det \begin{bmatrix} A & B \\ C & D \end{bmatrix} = 0$

Which statement *must* be true?

A. The system has no solution.

B. The system has infinitely many solutions.

C. The system has one unique solution, based on the values of p and q.

(D.) The system has either no solution or many solutions, depending on the values of p and q.

if p and q = 0, then infinitely many - if not then no sol.

22) Determine the sum $\begin{bmatrix} 3 & 0 & 0 & -1 \\ 8 & -2 & 0 & 0 \end{bmatrix} + \begin{bmatrix} 1 & 1 & 1 & 1 \\ -3 & -3 & -3 & -3 \end{bmatrix}$, if it exists.

(A.) $\begin{bmatrix} 4 & 1 & 1 & 0 \\ 5 & -5 & -3 & -3 \end{bmatrix}$

B. $\begin{bmatrix} 4 & 1 & 1 & 0 \\ 11 & 1 & 3 & 3 \end{bmatrix}$

C. $\begin{bmatrix} 6 & 6 \\ 14 & 14 \end{bmatrix}$

D. The sum does not exist.

add corresponding elements

$\begin{bmatrix} 4 & 1 & 1 & 0 \\ 5 & -5 & -3 & -3 \end{bmatrix}$

13) Carlos has investments in Funds A, B, and C. Each fund invests money in both stocks and bonds. The matrices show the dollar amounts invested in each fund and the annual yields. Use this information to determine how many dollars Fund B will earn in one year.

$$\begin{matrix} \\ A \\ B \\ C \end{matrix}\begin{bmatrix} \text{Stocks} & \text{Bonds} \\ \$10{,}000 & \$10{,}000 \\ \$15{,}000 & \$\ 5{,}000 \\ \$\ 5{,}000 & \$25{,}000 \end{bmatrix} \qquad \begin{matrix} \text{Annual Yield} \\ \text{Stocks} \\ \text{Bonds} \end{matrix}\begin{bmatrix} .06 \\ .04 \end{bmatrix}$$

(A.) \$ 1,100

B. \$ 1,500

C. \$ 2,000

D. \$20,000

$[A] \cdot [B]$

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Matrices EOC Questions

Multiple Choice
Identify the choice that best completes the statement or answers the question.

B 1. The first table shows the teams with the four best records halfway through their season. The second table shows the full season records for the same four teams. Which team had the best record during the second half of the season?

Record for the First half of the Season		
Team	Wins	Losses
Team 1	26	14
Team 2	27	13
Team 3	25	15
Team 4	24	16

Record for the Season		
Team	Wins	Losses
Team 1	59	21
Team 2	56	24
Team 3	56	24
Team 4	52	28

$\begin{bmatrix} 59 & 21 \\ 56 & 24 \\ 56 & 24 \\ 52 & 28 \end{bmatrix} - \begin{bmatrix} 26 & 14 \\ 27 & 13 \\ 25 & 15 \\ 24 & 16 \end{bmatrix} = \begin{bmatrix} 33 & 7 \\ 29 & 11 \\ 31 & 9 \\ 28 & 12 \end{bmatrix}$

a. Team 2
b. Team 1
c. Team 3
d. Team 4

C/D 2. If $A = \begin{bmatrix} -2 & 2 & 0 \\ -5 & 7 & 9 \end{bmatrix}$, $C = \begin{bmatrix} -1 & -1 & -2 \\ -7 & 3 & 2 \end{bmatrix}$, and $A - B = C$, what is B?

a. $\begin{bmatrix} -1 & 1 & -2 \\ -7 & 3 & 2 \end{bmatrix}$

b. $\begin{bmatrix} -1 & -1 & -2 \\ 7 & -3 & 2 \end{bmatrix}$

c. $\begin{bmatrix} -1 & 3 & 2 \\ 2 & 4 & 7 \end{bmatrix}$

d. $\begin{bmatrix} -1 & 3 & 2 \\ 2 & 4 & 7 \end{bmatrix}$

$\begin{bmatrix} -2 & 2 & 0 \\ -5 & 7 & 9 \end{bmatrix} - \begin{bmatrix} -1 & 3 & 2 \\ 2 & 4 & 7 \end{bmatrix} = \begin{bmatrix} -1 & -1 & -2 \\ -7 & 3 & 2 \end{bmatrix}$

Find the values of the variables.

D 3. $\begin{bmatrix} -8 + t & 0 \\ 8 & -12 \end{bmatrix} = \begin{bmatrix} -5 & 0 \\ 8 & -2y - 2 \end{bmatrix}$

a. $t = 5, y = 3$
b. $t = -13, y = 5$
c. $t = 3, y = 7$
d. $t = 3, y = 5$

$-8 + t = -5$
$t = 3$
$-12 = -2y - 2$
$-10 = -2y$
$y = 5$

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D 4. Find $-5A + 4B$.

$$A = \begin{bmatrix} 6 & 1 \\ -4 & -6 \\ 7 & -7 \end{bmatrix} \quad B = \begin{bmatrix} -5 & -1 \\ -3 & -8 \\ 6 & 8 \end{bmatrix}$$

$\begin{bmatrix} -30 & -5 \\ 20 & 30 \\ -35 & 35 \end{bmatrix} + \begin{bmatrix} -20 & -4 \\ -12 & -32 \\ 24 & 32 \end{bmatrix}$

a. $\begin{bmatrix} -10 & 9 \\ 8 & -2 \\ 16 & 67 \end{bmatrix}$

b. $\begin{bmatrix} -10 & 9 \\ 8 & -2 \\ -59 & -68 \end{bmatrix}$

c. $\begin{bmatrix} -50 & -9 \\ -1 & 16 \\ -11 & -68 \end{bmatrix}$

d. $\begin{bmatrix} -50 & -9 \\ 8 & -2 \\ -11 & 67 \end{bmatrix}$

Evaluate the determinant of the matrix.

C 5. $\begin{bmatrix} -4 & 5 & 6 \\ 0 & 4 & 4 \\ -2 & -5 & 4 \end{bmatrix}$ calc.

a. -104 b. -72 c. -136 d. 136

A 6. What is the area of the triangle with vertices $(-1,-4)$, $(-3,-2)$, and $(-4,-2)$?

a. 1 b. 1.5 c. 21.5 d. 23

plug in to matrix in calc., 1's on end mult. by 1/2 outside

Does the given matrix, A, have an inverse? If it does, what is A^{-1}?

B 7. $A = \begin{bmatrix} -7 & -25 \\ 2 & 7 \end{bmatrix}$

a. $\begin{bmatrix} -7 & -25 \\ -2 & -7 \end{bmatrix}$

b. $\begin{bmatrix} 7 & 25 \\ -2 & -7 \end{bmatrix}$

c. $\begin{bmatrix} 7 & 25 \\ -2 & 7 \end{bmatrix}$

d. does not exist

plug in calc.

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Solve the system.

C 8. $\begin{cases} 3x + y - 4z = -30 \\ 3x + 2y + 2z = -8 \\ 5x + 5y + z = -26 \end{cases}$

calc - rref

a. (–30, –8, –26)
b. (4, –2, 4)
c. (–4, –2, 4)
d. (–4, 2, –4)

C 9. $\begin{bmatrix} -5 & 2 & 0 \\ -5 & 9 & 9 \end{bmatrix} - \begin{bmatrix} -1 & 3 & 3 \\ 7 & 4 & 7 \end{bmatrix}$

calc

a. $\begin{bmatrix} -4 & -1 & -3 \\ 12 & -5 & 2 \end{bmatrix}$

b. $\begin{bmatrix} -4 & -1 & 3 \\ -12 & 5 & 2 \end{bmatrix}$

c. $\begin{bmatrix} -4 & -1 & -3 \\ -12 & 5 & 2 \end{bmatrix}$

d. $\begin{bmatrix} -4 & 1 & -3 \\ -12 & 5 & 2 \end{bmatrix}$

Find the product.

B 10. $\begin{bmatrix} -5 & -2 \\ -8 & -5 \end{bmatrix}\begin{bmatrix} -5 & 7 \\ -9 & -5 \end{bmatrix}$

calc

a. $\begin{bmatrix} 25 & 18 \\ -35 & 10 \end{bmatrix}$

b. $\begin{bmatrix} 43 & -25 \\ 85 & -31 \end{bmatrix}$

c. $\begin{bmatrix} 40 & 45 \\ -56 & 25 \end{bmatrix}$

d. $\begin{bmatrix} 43 & -25 \\ -31 & 85 \end{bmatrix}$