الفصل الدراسي الثاني : مراجعة الوحدة السادسة : المصفوفات (Matrices)

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Q(1) : Determine the **row operation** performed to obtain each matrix.

حدد عملية الصف التي تم القيام بها للحصول على كل مصفوفة .

1) $\begin{bmatrix} 1 & 5 & -6 & 3 \\ 0 & 1 & -3 & -2 \\ 0 & -1 & 2 & 1 \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 5 & -6 & 3 \\ 0 & 1 & -3 & -2 \\ 0 & 0 & -1 & -1 \end{bmatrix}$

$a)\ R_1 + R_2$ $b)\ R_2 + R_3$ $c)\ R_2 - R_3$ $d)\ -R_1 + R_2$

Q(2): Write the **augmented** matrix for the given system of equations.

- اكتب المصفوفة الموسعة لنظام المعادلات المعطى .

A)

$$x + 2y - z = 3$$
$$2x - y + 2z = 6$$
$$x - 3y + 3z = 4$$

$\begin{bmatrix} 1 & 2 & -1 & : & 3 \\ 2 & -1 & 2 & : & 6 \\ 1 & -3 & 3 & : & 4 \end{bmatrix}$

a) $\begin{bmatrix} 1 & 2 & -1 & : & 3 \\ 2 & -1 & 2 & : & 6 \\ 1 & -3 & 3 & & 4 \end{bmatrix}$ $b)$ $\begin{bmatrix} -1 & -2 & 1 & : & 6 \\ -2 & 1 & 2 & : & 3 \\ 4 & -3 & 3 & : & 4 \end{bmatrix}$ $c)$ $\begin{bmatrix} 1 & -2 & 1 & : & 6 \\ 2 & 1 & 2 & : & 3 \\ 4 & -3 & 3 & : & 4 \end{bmatrix}$

B)

$$4x - 3y = 11$$
$$3x + 2y = 4$$

$\begin{bmatrix} 4 & -3 & : & 11 \\ 3 & 2 & : & 4 \end{bmatrix}$

$a)$ $\begin{bmatrix} 4 & -3 & : & 11 \\ 4 & 3 & : & 3 \end{bmatrix}$ $b)$ $\begin{bmatrix} 4 & -3 & : & 11 \\ 3 & 2 & : & 4 \end{bmatrix}$ $c)$ $\begin{bmatrix} -4 & 3 & : & 11 \\ -3 & 2 & : & 4 \end{bmatrix}$

Q(3) : Find the system of equations from the **augmented** matrix .

$\begin{bmatrix} 1 & -3 & -5 & : & -2 \\ 2 & -5 & -4 & : & 5 \\ -3 & 5 & 4 & : & 6 \end{bmatrix}$

$$1x - 3y - 5z = -2$$
$$2x - 5y - 4z = 5$$
$$-3x + 5y + 4z = 6$$

$a)$ $x + 3y + 5z =$
$2x - 5y - 4z =$
$3x + 5y + 4z =$

$b)$ $x - 3y - 5z = -2$
$2x - 5y - 4z = 5$
$-3x + 5y + 4z = 6$

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Q(4): Solve the system of each equations. two variables (Mode → 5 → 1)

A)
$$3x + 4y = 10$$
$$x + 3y = 5$$

$x = 2$, $y = 1$

a) (1 , 2) b) (2 , 1) b) No solution c) infinite solutions

B)
$$3x + 4y = 12 \quad \times 2$$
$$6x + 8y = 24$$

infinite Solution

a) (2 , 1) b) (1 , 2) c) No solution d) infinite solutions

C)
$$8x - 8y - 8z = 24$$
$$-2x + 4y - 4z = -12$$
$$x - 3y + 4z = 4$$

Three variables (Mode 5 → 2)

$X = 20$, $y = 12$, $z = 5$

a) (20 , 12 , 5) b) (10 , 6 , 5) c) (5 , 10 , 4) d) (2 , 5 , 10)

Q(5) : Which matrices in **not** **row-echelon** form ?

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a
$$\begin{bmatrix} 1 & -2 & 5 & 6 & -7 \\ 0 & 1 & -3 & 0 & 2 \\ 0 & 0 & 1 & 3 & -5 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

b)
$$\begin{bmatrix} 1 & -2 & 3 & 6 & -4 \\ 0 & 1 & -2 & -6 & 2 \\ 0 & 0 & 1 & 7 & -5 \\ 0 & 0 & 0 & 1 & 9 \end{bmatrix}$$

c) No
$$\begin{bmatrix} 1 & -2 & 5 & 2 & -1 \\ 0 & 4 & -2 & 0 & 2 \\ 0 & 0 & 1 & 3 & -3 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

d)
$$\begin{bmatrix} 1 & -1 & 1 & 3 & 8 \\ 0 & 1 & 0 & -2 & 8 \\ 0 & 0 & 1 & 2 & 7 \\ 0 & 0 & 0 & 1 & 10 \end{bmatrix}$$

Q(6) : Evaluate the **determinant of** matrix A and B :

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

det(A) = (3 × -2) − (-4 × 2) = 2

a) -2 b) 2 c) 3 d) -3

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

① mode → 6 → ① → dim → 3×3 → insert → AC

② shift → 4 → ⑦ det → shift → 4 (3)

a) 25 b) 118 c) 81 d) 39

Q(7): Given that $A = \begin{bmatrix} -10 & 2 \\ 5 & -8 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 \\ -4 & -2 \end{bmatrix}$, determine $A \cdot B$.

a) $\begin{bmatrix} -38 & 6 \\ 42 & 21 \end{bmatrix}$ b) $\begin{bmatrix} -38 & 6 \\ 47 & 11 \end{bmatrix}$ c) $\begin{bmatrix} 38 & 6 \\ -47 & 11 \end{bmatrix}$ d) $\begin{bmatrix} 38 & -6 \\ 47 & 11 \end{bmatrix}$

Q(8) : Find the **inverse** of matrix A: $A = \begin{bmatrix} 3 & -1 \\ -5 & 2 \end{bmatrix}$

a) $A^{-1} = \begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}$ b) $A^{-1} = \begin{bmatrix} 3 & -1 \\ -5 & 2 \end{bmatrix}$ c) $A^{-1} = \begin{bmatrix} -2 & 5 \\ 1 & -3 \end{bmatrix}$

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Q(9): Which one of the following matrices is singular ?

A $P = \begin{bmatrix} -6 & 9 \\ 2 & 3 \end{bmatrix}$

B $Q = \begin{bmatrix} -6 & 9 \\ -2 & -3 \end{bmatrix}$

C $R = \begin{bmatrix} 6 & 9 \\ 2 & -3 \end{bmatrix}$

D $S = \begin{bmatrix} -6 & 9 \\ 2 & -3 \end{bmatrix}$

Q(10). A company sells a box that contains a mixture of pencils and pens. A pencil costs the company AED 0.25 and a pen costs AED 0.50. There are a total of 50 pencils and pens in the company of the pencils and pens in a box is AED 20. How many pencils and how many pens are in a box **?**

شركة تبيع علبة بها خليط من أقلام الرصاص واقلام الحبر .اذا كان قلم الرصاص يكلف الشركة **0.25** درهم قلم الحبر يكلف الشركة **0.50** درهم. يوجد إجمالي **50** قلما من الحبر والرصاص في الصندوق ، وثمن الصندوق من أقلام الرصاص والحبر في العلبة **20** يكلف درهمًا إماراتيًا. كم عدد أقلام الرصاص وكم عدد أقلام الحبر في الصندوق؟

a) There are 20 pencils and 20 pens .
b) There are 20 pencils and 30 pens
c) There are 30 pencils and 20 pens
d) There are 10 pencils and 40 pens

Reflection x-axis (change sign of y)

Q(11) :A triangle ABC with vertices **A(-1 ,-2) , B(0,-4) , C(2,-3)** , Find the **image** after reflected over the $x-axis$. $\Rightarrow (-1,2)$, $(0,4)$, $(2,3)$

$a)\ (-2,-1),(-4,0),(-3,2)$ $b)\ (-1,2),(0,4),(2,3)$ $c)\ (1,-2),(0,-4),(-2,-3)$

Q(12) :A triangle ABC with vertices **A(1 ,2) , B(-1,4) , C(2,3)** , Find the **image** after reflected over the $y-axis$ $\Rightarrow (-1,2)$, $(1,4)$, $(-2,3)$

$a)\ (-1,-2),(1,-4),(-2,-3)$ $b)\ (1,-2),(-1,-4),(2,-3)$ $c)\ (-1,2),(1,4),(-2,3)$

Q(13) :A triangle ABC with vertices **A(-1 ,-2) , B(0,-4) , C(2,-3) translated 2 units right and 3 units down , write the matrix represent the image after translation.**

A) $\begin{bmatrix} 1 & 2 & 4 \\ -5 & -7 & -6 \end{bmatrix}$	A) $\begin{bmatrix} -3 & -2 & 0 \\ -5 & -7 & -6 \end{bmatrix}$
c) $\begin{bmatrix} -5 & -7 & -6 \\ 1 & 2 & 4 \end{bmatrix}$	A) $\begin{bmatrix} -3 & -2 & 0 \\ 1 & -1 & 0 \end{bmatrix}$

up $(y+3)$, $(x-0)$, $(x+0)$, down $(y-0)$

Q(14) : Find the coordinates of the dilated kite ABCD with a scalar factor equal to 1.5 such that A(1,2), B(2,3) , C(3,2) and D(2,0).

$a)\begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 2 & 0 \end{bmatrix}$ $b)\begin{bmatrix} 1.5 & 3 & 4.5 & 3 \\ 3 & 4.5 & 3 & 0 \end{bmatrix}$

$c)\begin{bmatrix} 2 & 3 & 4 & 3 \\ 3 & 4 & 3 & 1 \end{bmatrix}$ $d)\begin{bmatrix} 2.5 & 3 & 4 & 3 \\ 3.5 & 5 & 3 & 0 \end{bmatrix}$

$1.5 \times \begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 2 & 0 \end{bmatrix} = \begin{bmatrix} 1.5 & 3 & 4.5 & 3 \\ 3 & 4.5 & 3 & 0 \end{bmatrix}$

Q(15) : Find the location of the points A(-1 ,2) , B(0 ,3) and C(1 , 2) at $\mathbf{90^0}$ counterclockwise rotation about the origin . $(-2,-1)$, $(-3,0)$, $(-2,1)$

$a)\begin{bmatrix} -1 & 0 & 1 \\ 2 & 3 & 2 \end{bmatrix}$ $b)\begin{bmatrix} -1 & 0 & 1 \\ -2 & -3 & -2 \end{bmatrix}$

$c)\begin{bmatrix} -2 & -3 & -2 \\ -1 & 0 & 1 \end{bmatrix}$ d) $\begin{bmatrix} -1 & 0 & -1 \\ 2 & 3 & -2 \end{bmatrix}$

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Rotation → $90^\circ cc$ $(4,2) \rightarrow (-2,4)$

→ $180^\circ cc$ $(-4,-2) \rightarrow (-4,-2)$

→ $270^\circ cc$ $(4,-2) \rightarrow (2,-4)$

Q(16) : Find the location of the points A(1 ,-2) , B(1 ,1) and C(-1 , 2) at 180^0 counterclockwise rotation about the origin .

$a)\begin{bmatrix} 1 & -1 & 1 \\ -2 & -1 & -2 \end{bmatrix}$ $b)\begin{bmatrix} -1 & -1 & 1 \\ 2 & -1 & -2 \end{bmatrix}$

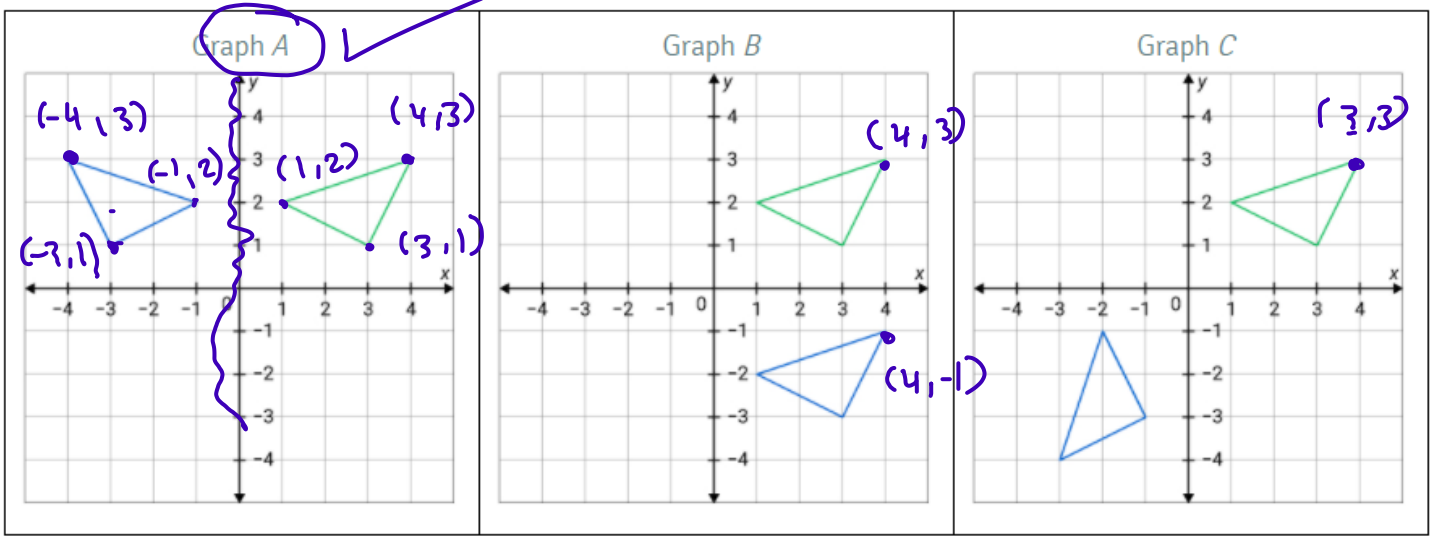
$c)\begin{bmatrix} 2 & 1 & 2 \\ -1 & 1 & -1 \end{bmatrix}$ $d)\begin{bmatrix} 1 & 1 & 1 \\ 2 & 1 & 2 \end{bmatrix}$

Q(16) : Find the location of the points A(1 ,-2) , B(1 ,1) and C(-1 , 2) at 270^0 counterclockwise rotation about the origin .

$a)\begin{bmatrix} 1 & -1 & 1 \\ -2 & -1 & -2 \end{bmatrix}$ $b)\begin{bmatrix} -1 & -1 & 1 \\ 2 & -1 & -2 \end{bmatrix}$

$c)\begin{bmatrix} -2 & 1 & 2 \\ -1 & -1 & 1 \end{bmatrix}$ $d)\begin{bmatrix} 1 & 1 & 1 \\ 2 & 1 & 2 \end{bmatrix}$

Q(17): Which graph represent reflection over $y-axis$?



Reflection

$(2,3) \xrightarrow{x\text{-axis}} (2,-3)$

$(2,3) \xrightarrow{y\text{-axis}} (-2,3)$

$(2,3) \xrightarrow{y=x} (3,2)$

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