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|---|---|---|---|
| Family name | Given name | Student number | |

# ENS1161 Computer Fundamentals

## Test 11

10/10.

(a) Given:

$$A = \begin{pmatrix} 0 & 2 & 4 \\ 1 & -3 & 5 \end{pmatrix} \quad \text{and} \quad B = \begin{pmatrix} 0 & 3 \\ 1 & -2 \\ 2 & 1 \end{pmatrix},$$

find the product AB.

$$AB = \begin{pmatrix} 10 & 0 \\ 7 & 14 \end{pmatrix}$$ ✓ 2.

(b) (i) Find the inverse of the matrix $\begin{pmatrix} 2 & -1 \\ 1 & -3 \end{pmatrix}$

$$M = \begin{pmatrix} 2 & -1 \\ 1 & -3 \end{pmatrix} \quad M^{-1} = \begin{pmatrix} 0.6 & -0.2 \\ 0.2 & -0.4 \end{pmatrix}$$ ✓ 2.

(ii) Use the result of part (i) to solve the system of equations:

$$\begin{aligned} 2x - y &= 4 \\ x - 3y &= -3 \end{aligned}$$

$$\begin{pmatrix} 2 & -1 \\ 1 & -3 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 4 \\ -3 \end{pmatrix}$$

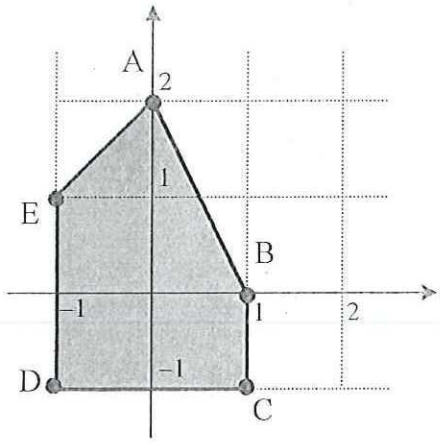
$$\begin{pmatrix} 0.6 & -0.2 \\ 0.2 & -0.4 \end{pmatrix} \begin{pmatrix} 2 & -1 \\ 1 & -3 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 0.6 & -0.2 \\ 0.2 & -0.4 \end{pmatrix} \begin{pmatrix} 4 \\ -3 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$$ ✓ 2

(c) Find the images A', B', C', D' and E' of the vertices of the polygon ABCDE under the transformation represented by the matrix

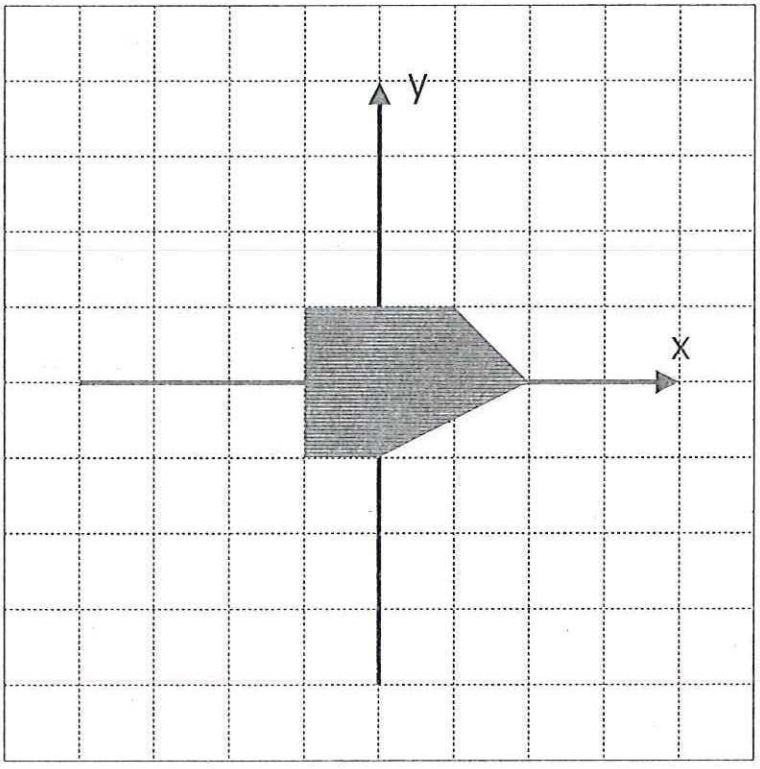
$$L = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$$




$$\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} \begin{pmatrix} 0 & 1 & 1 & -1 & -1 \\ 2 & 0 & -1 & -1 & 1 \end{pmatrix}$$ ✓

$$= \begin{pmatrix} 2 & 0 & -1 & -1 & 1 \\ 0 & -1 & -1 & 1 & 1 \end{pmatrix}$$ ✓

Then draw the image A'B'C'D'E' of the polygon on the set of axes provided.




✓

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[2 + 2 + 2 + 4 = 10 marks ]