

**Problem 4**

If  $\mathbf{A} = \begin{pmatrix} 3 - 2i & 1 + i \\ 2 - i & -2 + 3i \end{pmatrix}$ , find

(a)  $\mathbf{A}^T$

(b)  $\bar{\mathbf{A}}$

(c)  $\mathbf{A}^*$ 

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**Solution**

$\mathbf{A}^T$  is the transpose of  $\mathbf{A}$ ,  $\bar{\mathbf{A}}$  is the complex conjugate of  $\mathbf{A}$ , and  $\mathbf{A}^* = \bar{\mathbf{A}}^T$  is the adjoint of  $\mathbf{A}$ .

$$\mathbf{A}^T = \begin{pmatrix} 3 - 2i & 2 - i \\ 1 + i & -2 + 3i \end{pmatrix}$$

$$\bar{\mathbf{A}} = \begin{pmatrix} 3 + 2i & 1 - i \\ 2 + i & -2 - 3i \end{pmatrix}$$

$$\mathbf{A}^* = \begin{pmatrix} 3 + 2i & 2 + i \\ 1 - i & -2 - 3i \end{pmatrix}$$