Samples **Symmetric matrix**

1. A matrix A is said to be symmetric if $A^T = A$. Given any matrix Y we can construct a symmetric matrix X by calculating $X = Y^T Y$. Calculate X for each of the following choices of Y:

(a) $\begin{pmatrix} -9 & -3 & 5 \\ 3 & 8 & -5 \end{pmatrix}$

(b) $\begin{pmatrix} 7 & -4 \\ -2 & -3 \\ -8 & 4 \end{pmatrix}$

(c) $\begin{pmatrix} 8 & 0 & -6 \\ -3 & -3 & -5 \\ 2 & 7 & -5 \end{pmatrix}$

2. A matrix A is said to be symmetric if $A^T = A$. Given any matrix Y we can construct a symmetric matrix X by calculating $X = Y^T Y$. Calculate X for each of the following choices of Y:

(a) $\begin{pmatrix} -2 & -1 & -8 \\ 6 & 8 & 5 \end{pmatrix}$

(b) $\begin{pmatrix} 3 & 8 \\ -2 & -5 \\ 1 & 3 \end{pmatrix}$

(c) $\begin{pmatrix} 3 & -2 & -8 \\ -4 & -9 & -5 \\ -2 & -3 & -2 \end{pmatrix}$

3. A matrix A is said to be symmetric if $A^T = A$. Given any matrix Y we can construct a symmetric matrix X by calculating $X = Y^T Y$. Calculate X for each of the following choices of Y:

(a) $\begin{pmatrix} 6 & 4 & 7 \\ -5 & 1 & -1 \end{pmatrix}$

(b) $\begin{pmatrix} 3 & 6 \\ -4 & 6 \\ 2 & -2 \end{pmatrix}$

(c) $\begin{pmatrix} 9 & -1 & 9 \\ 4 & 4 & -8 \\ 2 & 8 & -5 \end{pmatrix}$

4. A matrix A is said to be symmetric if $A^T = A$. Given any matrix Y we can construct a symmetric matrix X by calculating $X = Y^T Y$. Calculate X for each of the following choices of Y:

(a) $\begin{pmatrix} -3 & 5 & 1 \\ -7 & -2 & 1 \end{pmatrix}$

(b) $\begin{pmatrix} 2 & -4 \\ 1 & 4 \\ 8 & -5 \end{pmatrix}$

(c) $\begin{pmatrix} 9 & 4 & 5 \\ 8 & 9 & 1 \\ -8 & -4 & 9 \end{pmatrix}$

5. A matrix A is said to be symmetric if $A^T = A$. Given any matrix Y we can construct a symmetric matrix X by calculating $X = Y^T Y$. Calculate X for each of the following choices of Y:

(a) $\begin{pmatrix} -4 & -3 & 0 \\ -1 & -7 & 2 \end{pmatrix}$

(b) $\begin{pmatrix} -6 & 1 \\ 2 & -9 \\ -9 & -7 \end{pmatrix}$

(c) $\begin{pmatrix} 7 & -6 & -2 \\ 8 & 4 & -8 \\ -8 & 6 & -4 \end{pmatrix}$