Answers: Introduction to matrices

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Summary

Answers to questions for the study guide on introduction to matrices.

These are the answers to Questions: Introduction to matrices.

Please attempt the questions before reading these answers!

Q1

1.1.

The matrix A has dimension 2×3.

The matrix B has dimension 2×2.

The matrix C has dimension 3×4.

The matrix D has dimension 3×2.

The matrix E has dimension 3×3.

The matrix F has dimension 3×3.

The matrix G has dimension 5×1.

The matrix H has dimension 4×3.

1.2.

a. $[A]_{11} = 2$

b. $[G]_{41} = 8$

c. $[D]_{12} = -1$

d. $[F]_{32} = 0$

e. $[B]_{21} = 3$

f. $[A]_{12} = -1$

g. $[C]_{23} = 1$

h. $[E]_{23} = -4$

i. $[H]_{31} = x$

j. $[H]_{13} = 4$

k. $[E]_{32} = -6$

l. $[G]_{11} = -1$

1.3.

$\mathsf{diag}(A) = (2, 4)$

$\mathsf{diag}(C) = (0, -\sqrt{2}, -7)$

$\mathsf{diag}(E) = (1, 3, 7)$

$\mathsf{diag}(G) = (-1)$

Q2

2.1. $X + Y = \begin{bmatrix} 2 \\ 5 - \sqrt{5} \\ 8/3 \\ \pi - \sqrt{7} \end{bmatrix}$

2.2. $Z - W = \begin{bmatrix} -1 + \sqrt{3} & -2 & -1/2 \\ -10 & 6 & -3 \\ 3 & 6 & 10 - \pi \end{bmatrix}$

2.3. $N + M = \begin{bmatrix} -\pi + 1 & -5/4 & 2 & 6 \\ 5 & 1 - \sqrt{5} & x + \sqrt{2} & 1 \end{bmatrix}$

2.4. $O - P = \begin{bmatrix} 1-\sqrt{3} & 2 \\ 3-\pi & -1 \\ 1 & -6 \end{bmatrix}$

2.5. $3X = \begin{bmatrix} 9 \\ -3\sqrt{5} \\ 6 \\ 3\pi \end{bmatrix}$

2.6. $-2Y = \begin{bmatrix} 2 \\ -10 \\ -4/3 \\ 2\sqrt{7} \end{bmatrix}$

2.7. $xZ = \begin{bmatrix} x & -2x & 3x \\ 4x & x & -5x \\ 6x & -7x & \pi x \end{bmatrix}$

2.8. $-4W = \begin{bmatrix} \sqrt{3} & -4 & 5/2 \\ 24 & -28 & 32 \\ -36 & 4 & -40 \end{bmatrix}$

2.9. $yM = \begin{bmatrix} y & -2y & 3y & 4y \\ 5y & -y & \sqrt{2}y & -6y \end{bmatrix}$

2.10. $7N = \begin{bmatrix} -7\pi & 21/4 & -7 & 14 \\ 0 & -7\sqrt{5} & 7x & 49 \end{bmatrix}$

2.11. $(1/2)O = \begin{bmatrix} 1/2 & -1 \\ 3/2 & 2 \\ -5/2 & 1/2 \end{bmatrix}$

2.12. $-4P = \begin{bmatrix} -4\sqrt{3} & 16 \\ -4\pi & -20 \\ 24 & 28 \end{bmatrix}$

2.13. $3X + Y = \begin{bmatrix} 8 \\ 5 - 3\sqrt{5} \\ 20/3 \\ 3\pi - \sqrt{7} \end{bmatrix}$

2.14. $-2(Z + W) = \begin{bmatrix} -2 - 2\sqrt{3} & 12 & -11 \\ 4 & -16 & 26 \\ -30 & 14 = 2 & -20 - 2\pi \end{bmatrix}$

2.15. $N - 4M = \begin{bmatrix} -4 - \pi & 35/4 & -13 & -14 \\ -20 & 4 - \sqrt{5} & x - 4\sqrt{2} & 31 \end{bmatrix}$

Q3

3.1. Q, S, T are all square, but R isn't.

3.2. Q, T are upper triangular, but R, S aren't.

3.3. S, T are lower triangular, but Q, R aren't.

3.4. T is diagonal, but Q, R, S aren't.

Version history

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