

Matrix Operations, Determinants and Inverses

Grade 12 – Precalculus math · Test · Standards: N-VM.C.6, N-VM.C.7, N-VM.C.8, N-VM.C.9, N-VM.C.10

Name: _____ Date: _____ Class: _____

This 45-minute test has 8 questions worth 20 points. Show every row-by-column computation. Give exact fractions rather than rounded decimals unless the question asks for money.

Standards: N-VM.C.6, N-VM.C.7, N-VM.C.8, N-VM.C.9, N-VM.C.10 · **Level:** Grade 12 Precalculus

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

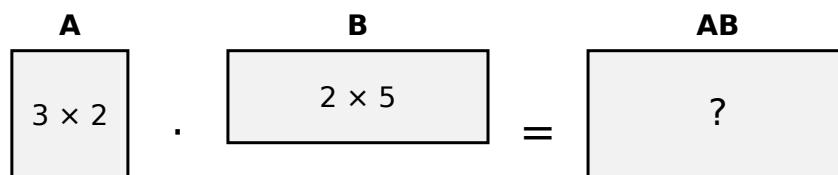
Question 1 Combining Matrices (2 points)

Let A have rows $(3, -1)$ and $(0, 4)$, and B have rows $(2, 5)$ and $(-3, 1)$. Find $2A - B$.

Question 2 A 2×2 Product (2 points)

Find AB , where A has rows $(4, -2)$ and $(1, 3)$, and B has rows $(-1, 5)$ and $(2, 0)$.

Question 3 Sizes of Products (2 points)



inner numbers must match

Sizes in the diagram: 3 by 2 and 2 by 5.

Suppose A has size 3×2 , B has size 2×5 and C has size 3×5 .

- Can AB be formed? If so, state its size. (1 point)
- Can BA be formed? Can $A + C$ be formed? Explain. (1 point)

Question 4 Determinants (2 points)

(a) Compute the determinant of the matrix with rows $(-3, 7)$ and $(2, 5)$. (1 point)

(b) Determine every k that makes the matrix with rows $(k, 9)$ and $(4, k)$ singular. (1 point)

Question 5 An Inverse Matrix (3 points)

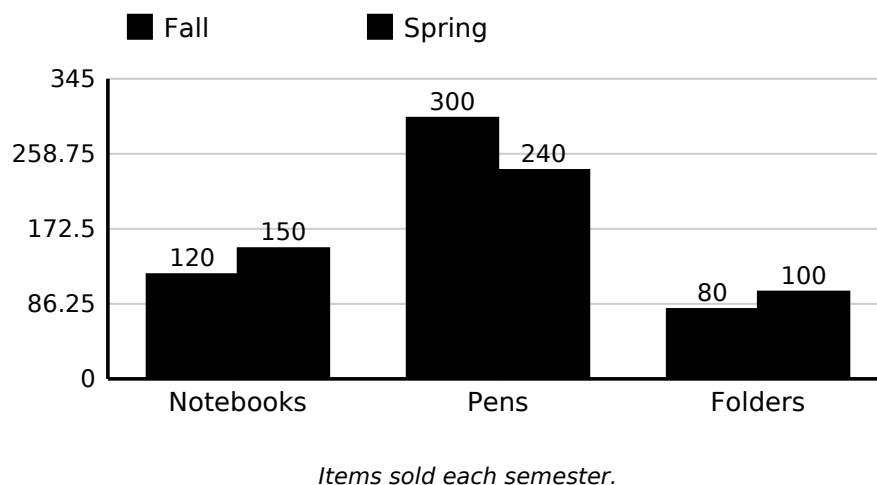
Let A have rows $(2, 4)$ and $(3, 5)$.

- Find $\det A$. (1 point)
- Find A^{-1} . (1 point)
- Verify your answer by showing that $AA^{-1} = I$. (1 point)

Question 6 A Row of a 3×3 Product (3 points)

Let A have rows $(2, 0, 1)$, $(1, 3, -2)$ and $(0, 4, 1)$, and B have rows $(1, -1, 2)$, $(0, 2, 3)$ and $(3, 1, -1)$. Find the second row of AB .

Question 7 School Store Revenue (3 points)



A school store sells notebooks at \$3.00, pens at \$1.25 and folders at \$2.00. The figure shows what it sold in two semesters.

- Write the sales as a 2×3 matrix and the prices as a 3×1 matrix. (1 point)
- Find the product that gives the revenue for each semester. (1 point)
- State which semester earned more and by how much. (1 point)

Question 8 Products and Determinants (3 points)

Let A have rows $(2, 0)$ and $(1, 3)$, and B have rows $(1, 4)$ and $(-2, 1)$.

- Find AB . (1 point)
- Find BA . Is $AB = BA$? (1 point)
- Find $\det(AB)$, $\det A$ and $\det B$. What do you notice? (1 point)