

## ✓ Congratulations! You passed!

Grade received **100%** To pass 80% or higher

Go to next item

1. Solve the system of equations using the method of elimination and select the correct answer.

1 / 1 point

$$\begin{cases} x + y = 4 \\ -6x + 2y = 16 \end{cases}$$

- ☒  $x = -1, y = 5$
- ☐ The system has infinitely many solutions.
- ☐  $x = 1, y = 3$
- ☐  $x = 0, y = 0$
- ☐ The system has no solution.

✓ Correct

Correct! The solution for the system of equations is a unique point at  $x = -1, y = 5$ , as shown: 
$$\begin{cases} -1 + 5 = 4 \\ -6(-1) + 2 * 5 = 16 \end{cases}$$

2. For the questions 2-3, calculate the determinant of the matrices and determine if the matrices are singular or non-singular:

1 / 1 point

$$\begin{bmatrix} 4 & -3 \\ 7 & -8 \end{bmatrix}$$

- ☒ -11, Non-singular
- ☐ -53, Non-singular
- ☐ -11, Singular
- ☐ -53, Singular

✓ Correct

Correct! You can compute the determinant of a two-by-two matrix using the formula  $ad - bc$ , as explained in the video: ["Singular vs Non-singular Matrices"](#) [↗](#).

3.

$$\begin{bmatrix} -3 & 8 & 1 \\ 2 & 2 & -1 \\ -5 & 6 & 2 \end{bmatrix}$$

1 / 1 point

- ☐ 36, Non-singular
- ☐ -80, Non-singular
- ☐ -20, Non-singular
- ☐ 0, Non-singular
- ☒ 0, Singular

✓ Correct

Correct! As explained in the video "Determinant for larger matrices", you can use the formula  $aei + bfg + cdh - afh - bdi - ceg$  to calculate the determinant of a three-by-three matrix. If the determinant is zero, then the matrix is singular.

4. Determine if the provided matrix has linearly dependent or independent rows (a, b, c, d, e, f are any real numbers):

1 / 1 point

$$\begin{bmatrix} a & b & c \\ d & e & f \\ 2a-d & 2b-e & 2c-f \end{bmatrix}$$

Hint: Can one row in the matrix be obtained as a result of operations on the other rows?

- ☐ It cannot be determined.
- ☒ Dependent
- ☐ Independent

✓ **Correct**

Great work! Row 3 can be obtained by adding (2 \* row 1) + (-1 \* row 2).

5. Which of the following operations, when applied to the rows of the matrix, do not change the singularity (or non-singularity) of the matrix:

1 / 1 point

- ☐ Adding a nonzero fixed value to every entry of the row.
- ☒ Multiplying a row by a nonzero scalar.

✓ **Correct**

Correct!

- ☒ Switching rows.

✓ **Correct**

Well done!

- ☒ Adding a row to another one.

✓ **Correct**

Correct!

6. In the following matrix:

1 / 1 point

$$\begin{bmatrix} a & a \\ b & c \end{bmatrix}$$

a, b, and c are non-zero real numbers. If the matrix is non-singular, which of the following must be true:

- ☒  $c \neq b$

✓ **Correct**

Correct! You can compute the determinant of a matrix using the formula  $ad - bc$ . Use this formula and the fact that the matrix is non-singular to solve this question.

- ☐  $c = b$

- ☒  $a = b$  only if  $c \neq a$

✓ **Correct**

Correct! You can compute the determinant of a matrix using the formula  $ad - bc$ . Please double-check if you did the calculation correctly.

- ☐  $c = a$  only if  $a = b$

7. Luis went yesterday to the bank to find out the interest rate of three different financial instruments. He received the following information:

1 / 1 point

Financial instrument	Savings account	Certificate of Deposit (CD)	Bonds
Annual interest	2%	3%	4%

He wants to invest his USD \$10,000 savings in these three accounts. By doing so, he knows that after a year he would receive a total of US \$ 260 in interest if he put twice as much money in the savings account as in the CDs, and “z” money in bonds.

Calculate the value of “z”, in USD, using the elimination method explained in the lectures.

- ☐  $z = \text{USD } \$2800$

- ☒  $z = \text{USD } \$1600$
- ☐  $z = \text{USD } \$5600$
- ☐ It cannot be determined.



**Correct**

Correct! He needs to invest US \$1.600 in bonds, US \$5.600 in the savings account and US \$2.800 in CDs.