姓名 Name : _____ 學號 Student ID # : _____

Quiz 3 MATH 103 / GEAI 1215: Linear Algebra I

Let

$$\mathbf{A} = \begin{bmatrix} 1 & 4 & 3 \\ 0 & 1 & -3 \\ -1 & -1 & -11 \\ 7 & 9 & 73 \end{bmatrix} \text{ and } \mathbf{b} = \begin{bmatrix} 9 \\ -10 \\ -36 \\ 238 \end{bmatrix}.$$

Suppose β is the basis formed by the columns of $\mathbf{A}$. Find $\mathrm{Repr}_\beta(\mathbf{b})$.

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10

Solution.

Solve the system of linear equations $\mathbf{Ax} = \mathbf{b}$, using Gaussian elimination or any method you like. The answer is

$$\mathrm{Repr}_\beta(\mathbf{b}) = \mathbf{x} = \boxed{\begin{bmatrix} 4 \\ -1 \\ 3 \end{bmatrix}}.$$

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10 = 6.

Indicating your answer by **underlining it** or **circling it**.
Compute the **check code** and fill it into the **box on the right**.

check code

6

姓名 Name : _____ 學號 Student ID # : _____

Quiz 3 MATH 103 / GEAI 1215: Linear Algebra I

Let

$$\mathbf{A} = \begin{bmatrix} 1 & 5 & -5 \\ 4 & 21 & -25 \\ -5 & -27 & 36 \\ 1 & 4 & 1 \end{bmatrix} \text{ and } \mathbf{b} = \begin{bmatrix} -14 \\ -55 \\ 67 \\ -16 \end{bmatrix}.$$

Suppose β is the basis formed by the columns of $\mathbf{A}$. Find $\mathrm{Repr}_\beta(\mathbf{b})$.

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10

Solution.

Solve the system of linear equations $\mathbf{Ax} = \mathbf{b}$, using Gaussian elimination or any method you like. The answer is

$$\mathrm{Repr}_\beta(\mathbf{b}) = \mathbf{x} = \boxed{\begin{bmatrix} 1 \\ -4 \\ -1 \end{bmatrix}}.$$

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10 = 6.

Indicating your answer by **underlining it** or **circling it**.
Compute the **check code** and fill it into the **box on the right**.

check code

6

姓名 Name : _____ 學號 Student ID # : _____

Quiz 3 MATH 103 / GEAI 1215: Linear Algebra I

Let

$$\mathbf{A} = \begin{bmatrix} 1 & 0 & -1 \\ 1 & 1 & 0 \\ -1 & 4 & 6 \\ -5 & -15 & -13 \end{bmatrix} \text{ and } \mathbf{b} = \begin{bmatrix} 1 \\ 5 \\ 19 \\ -77 \end{bmatrix}.$$

Suppose β is the basis formed by the columns of $\mathbf{A}$. Find $\text{Repr}_\beta(\mathbf{b})$.

Check code = (sum of all entries of $\text{Repr}_\beta(\mathbf{b})$) mod 10

Solution.

Solve the system of linear equations $\mathbf{Ax} = \mathbf{b}$, using Gaussian elimination or any method you like. The answer is

$$\text{Repr}_\beta(\mathbf{b}) = \mathbf{x} = \boxed{\begin{bmatrix} 5 \\ 0 \\ 4 \end{bmatrix}}.$$

Check code = (sum of all entries of $\text{Repr}_\beta(\mathbf{b})$) mod 10 = 9.

Indicating your answer by **underlining it** or **circling it**.
Compute the **check code** and fill it into the **box on the right**.

check code

9

姓名 Name : _____ 學號 Student ID # : _____

Quiz 3 MATH 103 / GEAI 1215: Linear Algebra I

Let

$$\mathbf{A} = \begin{bmatrix} 1 & -4 & -1 \\ -5 & 21 & 1 \\ -16 & 67 & 5 \\ 38 & -158 & -17 \end{bmatrix} \text{ and } \mathbf{b} = \begin{bmatrix} 12 \\ -46 \\ -154 \\ 384 \end{bmatrix}.$$

Suppose β is the basis formed by the columns of $\mathbf{A}$. Find $\text{Repr}_\beta(\mathbf{b})$.

Check code = (sum of all entries of $\text{Repr}_\beta(\mathbf{b})$) mod 10

Solution.

Solve the system of linear equations $\mathbf{Ax} = \mathbf{b}$, using Gaussian elimination or any method you like. The answer is

$$\text{Repr}_\beta(\mathbf{b}) = \mathbf{x} = \boxed{\begin{bmatrix} 0 \\ -2 \\ -4 \end{bmatrix}}.$$

Check code = (sum of all entries of $\text{Repr}_\beta(\mathbf{b})$) mod $10 = 4$.

Indicating your answer by **underlining it** or **circling it**.
Compute the **check code** and fill it into the **box on the right**.

check code

4

姓名 Name : _____ 學號 Student ID # : _____

Quiz 3 MATH 103 / GEAI 1215: Linear Algebra I

Let

$$\mathbf{A} = \begin{bmatrix} 1 & 3 & 3 \\ 3 & 10 & 14 \\ 5 & 15 & 16 \\ 20 & 65 & 87 \end{bmatrix} \text{ and } \mathbf{b} = \begin{bmatrix} -8 \\ -28 \\ -40 \\ -180 \end{bmatrix}.$$

Suppose β is the basis formed by the columns of $\mathbf{A}$. Find $\mathrm{Repr}_\beta(\mathbf{b})$.

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10

Solution.

Solve the system of linear equations $\mathbf{Ax} = \mathbf{b}$, using Gaussian elimination or any method you like. The answer is

$$\mathrm{Repr}_\beta(\mathbf{b}) = \mathbf{x} = \boxed{\begin{bmatrix} 4 \\ -4 \\ 0 \end{bmatrix}}.$$

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10 = 0.

Indicating your answer by **underlining it** or **circling it**.
Compute the **check code** and fill it into the **box on the right**.

check code

0

姓名 Name : _____ 學號 Student ID # : _____

Quiz 3 MATH 103 / GEAI 1215: Linear Algebra I

Let

$$\mathbf{A} = \begin{bmatrix} 1 & 4 & 0 \\ -5 & -19 & -3 \\ -13 & -49 & -8 \\ -34 & -128 & -21 \end{bmatrix} \text{ and } \mathbf{b} = \begin{bmatrix} 9 \\ -51 \\ -132 \\ -345 \end{bmatrix}.$$

Suppose β is the basis formed by the columns of $\mathbf{A}$. Find $\mathrm{Repr}_\beta(\mathbf{b})$.

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10

Solution.

Solve the system of linear equations $\mathbf{Ax} = \mathbf{b}$, using Gaussian elimination or any method you like. The answer is

$$\mathrm{Repr}_\beta(\mathbf{b}) = \mathbf{x} = \boxed{\begin{bmatrix} -3 \\ 3 \\ 3 \end{bmatrix}}.$$

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10 = 3.

Indicating your answer by **underlining it** or **circling it**.
Compute the **check code** and fill it into the **box on the right**.

check code

3

姓名 Name : _____ 學號 Student ID # : _____

Quiz 3 MATH 103 / GEAI 1215: Linear Algebra I

Let

$$\mathbf{A} = \begin{bmatrix} 1 & -4 & 2 \\ 0 & 1 & -5 \\ -1 & 4 & -1 \\ -4 & 11 & 16 \end{bmatrix} \text{ and } \mathbf{b} = \begin{bmatrix} 13 \\ 0 \\ -14 \\ -51 \end{bmatrix}.$$

Suppose β is the basis formed by the columns of $\mathbf{A}$. Find $\mathrm{Repr}_\beta(\mathbf{b})$.

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10

Solution.

Solve the system of linear equations $\mathbf{Ax} = \mathbf{b}$, using Gaussian elimination or any method you like. The answer is

$$\mathrm{Repr}_\beta(\mathbf{b}) = \mathbf{x} = \boxed{\begin{bmatrix} -5 \\ -5 \\ -1 \end{bmatrix}}.$$

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10 = 9.

Indicating your answer by **underlining it** or **circling it**.
Compute the **check code** and fill it into the **box on the right**.

check code

9

姓名 Name : _____ 學號 Student ID # : _____

Quiz 3 MATH 103 / GEAI 1215: Linear Algebra I

Let

$$\mathbf{A} = \begin{bmatrix} 1 & 5 & -4 \\ -5 & -24 & 22 \\ 12 & 57 & -53 \\ -5 & -23 & 24 \end{bmatrix} \text{ and } \mathbf{b} = \begin{bmatrix} 11 \\ -61 \\ 147 \\ -67 \end{bmatrix}.$$

Suppose β is the basis formed by the columns of $\mathbf{A}$. Find $\mathrm{Repr}_\beta(\mathbf{b})$.

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10

Solution.

Solve the system of linear equations $\mathbf{Ax} = \mathbf{b}$, using Gaussian elimination or any method you like. The answer is

$$\mathrm{Repr}_\beta(\mathbf{b}) = \mathbf{x} = \boxed{\begin{bmatrix} -1 \\ 0 \\ -3 \end{bmatrix}}.$$

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10 = 6.

Indicating your answer by **underlining it** or **circling it**.
Compute the **check code** and fill it into the **box on the right**.

check code

6

姓名 Name : _____ 學號 Student ID # : _____

Quiz 3 MATH 103 / GEAI 1215: Linear Algebra I

Let

$$\mathbf{A} = \begin{bmatrix} 1 & -1 & -4 \\ -5 & 6 & 24 \\ 25 & -30 & -119 \\ 24 & -28 & -111 \end{bmatrix} \text{ and } \mathbf{b} = \begin{bmatrix} -12 \\ 67 \\ -333 \\ -314 \end{bmatrix}.$$

Suppose β is the basis formed by the columns of $\mathbf{A}$. Find $\mathrm{Repr}_\beta(\mathbf{b})$.

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10

Solution.

Solve the system of linear equations $\mathbf{Ax} = \mathbf{b}$, using Gaussian elimination or any method you like. The answer is

$$\mathrm{Repr}_\beta(\mathbf{b}) = \mathbf{x} = \boxed{\begin{bmatrix} -5 \\ -1 \\ 2 \end{bmatrix}}.$$

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10 = 6.

Indicating your answer by **underlining it** or **circling it**.
Compute the **check code** and fill it into the **box on the right**.

check code

6

姓名 Name : _____ 學號 Student ID # : _____

Quiz 3 MATH 103 / GEAI 1215: Linear Algebra I

Let

$$\mathbf{A} = \begin{bmatrix} 1 & -1 & 1 \\ 3 & -2 & 0 \\ -8 & 4 & 5 \\ 18 & -10 & -8 \end{bmatrix} \text{ and } \mathbf{b} = \begin{bmatrix} -3 \\ -19 \\ 69 \\ -144 \end{bmatrix}.$$

Suppose β is the basis formed by the columns of $\mathbf{A}$. Find $\mathrm{Repr}_\beta(\mathbf{b})$.

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10

Solution.

Solve the system of linear equations $\mathbf{Ax} = \mathbf{b}$, using Gaussian elimination or any method you like. The answer is

$$\mathrm{Repr}_\beta(\mathbf{b}) = \mathbf{x} = \boxed{\begin{bmatrix} -3 \\ 5 \\ 5 \end{bmatrix}}.$$

Check code = (sum of all entries of $\mathrm{Repr}_\beta(\mathbf{b})$) mod 10 = 7.