1.(1 pt)

$$\mathbf{A} = \begin{pmatrix} -10 \\ 0 \\ 9 \end{pmatrix}, \qquad \mathbf{B} = \begin{pmatrix} -5 \\ 2 \\ 5 \end{pmatrix}, \qquad \mathbf{C} = \begin{pmatrix} 10 \\ -2 \\ -11 \end{pmatrix}$$

[?] 1. Determine whether or not the three vectors listed above are linearly independent or linearly dependent:

If they are linearly dependent, determine a non-trivial linear relation - (a non-trivial relation is three numbers which are not all three zero.) otherwise, if the vectors are linearly independent, enter 0's for the coefficients, since that relationship **always** holds.

_____ **A** + _____ **B** + _____ **C** = 0

You can use this **row reduction tool** to help with the calculations.

2.(1 pt)

$$\mathbf{A} = \begin{pmatrix} -10 & -11 & 0 \end{pmatrix}, \quad \mathbf{B} = \begin{pmatrix} 5 & 4 & 1 \end{pmatrix},$$
$$\mathbf{C} = \begin{pmatrix} 15 & 18 & -1 \end{pmatrix}$$

[?] 1. Determine whether or not the three vectors listed above are linearly independent or linearly dependent:

The vectors were written horizontally this time, as they often are in books, but that is just to save space. The problem is the same as if the vectors were written vertically.

If they are linearly dependent, determine a non-trivial linear relation - (a non-trivial relation is three numbers which are not all three zero.) otherwise, if the vectors are linearly independent, enter 0's for the coefficients, since that relationship **always** holds.

_____ **A** + _____ **B** + _____ **C** = 0

You can use this **row reduction tool** to help with the calculations.

3.(1 pt)

$$\mathbf{A} = \begin{pmatrix} 1 \\ -1 \\ -3 \\ 2 \end{pmatrix}, \qquad \mathbf{B} = \begin{pmatrix} -2 \\ 0 \\ 5 \\ -7 \end{pmatrix}, \qquad \mathbf{C} = \begin{pmatrix} -1 \\ -1 \\ 3 \\ -8 \end{pmatrix}, \qquad \mathbf{D} = \begin{pmatrix} 2 \\ -2 \\ -1 \\ -11 \end{pmatrix}$$

[?] 1. Determine whether or not the four vectors listed above are linearly independent or linearly dependent:

If they are linearly dependent, determine a non-trivial linear relation - (a non-trivial relation is three numbers which are not all three zero.) Otherwise, if the vectors are linearly independent, enter 0's for the coefficients, since that relationship **always** holds.

_____ **A** + _____ **B** + _____ **C** + _____ **D** = 0

You can use this **row reduction tool** to help with the calculations.

4.(1 pt) Let $f =$ "$exp(t)$", $g =$ "t", $h =$ "$2 + 3 * t$". Give the answer 1 if f, g, and h are linearly dependent and 0 if they are linearly independent.

linearly dependent? = _____

5.(1 pt)

Determine which of the following pairs of functions are linearly independent.

[?] 1. $f(\theta) = \cos(3\theta)$, $g(\theta) = 2\cos^3(\theta) - 4\cos(\theta)$

[?] 2. $f(t) = 2t^2 + 14t$, $g(t) = 2t^2 - 14t$

[?] 3. $f(x) = x^2$, $g(x) = 4|x|^2$

[?] 4. $f(t) = 3t$, $g(t) = |t|$

6.(1 pt) Determine whether the following pairs of functions are linearly independent or not.

[?] 1. The Wronskian of two functions is $W(t) = t$ are the functions linearly independent or dependent?

[?] 2. $f(\theta) = 5\cos 3\theta$ and $g(\theta) = 20\cos^3\theta - 15\cos\theta$

[?] 3. $f(t) = t$ and $g(t) = |t|$

7.(1 pt)

The vectors

$$v = \begin{bmatrix} -5 \\ 6 \\ -27 \end{bmatrix}, \; u = \begin{bmatrix} 3 \\ -3 \\ 8+k \end{bmatrix}, \; w = \begin{bmatrix} 1 \\ -3 \\ 9 \end{bmatrix}$$

are linearly independent if and only if $k \neq$ _____