Assignment Math45-Module-09-Exercises due 10/15/2020 at 11:59pm PDT

Suppose $y_1 = \sin(x)$ and $y_2 = \cos(x)$ are solutions to a homogeneous linear differential equation F(x, y, y', y'') = 0. Which of the following best reflects what are additional solutions for the differential equation?

• A. $y = 2\sin(x) - 3\cos(x)$

B. All of the functions listed here.

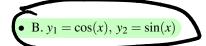
- C. $y = -3\cos(x) \pi\sin(x)$
- D. $y = \sqrt{2}\sin(x) + 3\cos(x)$

Answer(s) submitted:

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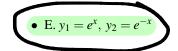
(incorrect)

- **2.** (1 point) Select the following pairs of functions that are linearly independent.
 - A. $y_1 = 9x$, $y_2 = x$



• C.
$$y_1 = 1$$
, $y_2 = x$

• D. $y_1 = e^x$, $y_2 = 5e^x$



- F. $y_1 = \sin(x)$, $y_2 = -\sin(x)$
- G. None of the above

Answer(s) submitted:

(incorrect)

Suppose $F(x, y, y', y'', \dots, y^{(8)}) = 0$ an order 8 linear differential equation. Which of the following statements is NOT true, regarding a fundamental set of solutions for the DE?

- A. That the functions in the set are linearly independent.
- B. That any of the functions multiplied together form another solution.
- C. That the set must consit of 8 functions..
- D. That the functions in the set are all solutions.

Answer(s) submitted:

(incorrect)

4. (1 point) Suppose $y_1 = e^{5x}$ and $y_2 = e^{2x}$ are solutions to a homogeneous linear differential equation. Use the Wronskian to show that the solutions are linearly independent.

to show that the solutions are linearly independent. Wronskian = det
$$\begin{bmatrix} \frac{e^{5x}}{5e^{5x}} & \frac{e^{3x}}{2e^{2x}} \end{bmatrix} = \frac{-3e^{5x}}{2e^{2x}}$$

These solutions are linearly independent because the Wronskian is [Choose/zero nonzero] for all x.

Answer(s) submitted:

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(incorrect)

5 It can be shown that $y_1 = e^{-3x}$ and $y_2 = xe^{-3x}$ are solutions to the differential equation y'' + 6y' + 9y = 0 on $(-\infty, \infty)$.

What does the Wronskian of y_1, y_2 equal on $(-\infty, \infty)$? $W(y_1, y_2) = \underbrace{e^{-6x}}_{}$ on $(-\infty, \infty)$.

? 1. Is $\{y_1, y_2\}$ a fundamental set for y'' + 6y' + 9y = 0 on $(-\infty, \infty)$?

Answer(s) submitted:

 $W \neq \emptyset \rightarrow \{y_1, y_2\}$ is a fundamental

#6 Suppose $y = c_1y_1 + \cdots + c_ny_n$ a general solution for a homogeneous linear differential equation of order 4. Which of the following statements is NOT true, regarding the functions y_1, \dots, y_n ?

• A. That any two of the functions multiplied together are again a solution.

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B. That the functions are linearly independent.

- C. That n = 4.
- D. That the functions are all solutions of the DE.

Answer(s) submitted:

(incorrect)