
Q1 Are $f_1(x) = x$, $f_2(x) = x^2$, and $f_3(x) = 3x - 8x^2$ linearly independent or linearly dependent on $(-\infty, \infty)$?

- A. Linearly dependent
- B. Linearly independent

Q2 Are $f_1(x) = 3$, $f_2(x) = \sin^2(x)$, and $f_3(x) = \cos^2(x)$ linearly independent or linearly dependent on $(-\infty, \infty)$?

- A. Linearly dependent
- B. Linearly independent

Q3 Are $f_1(x) = e^{-2x}$ and $f_2(x) = e^{3x}$ solutions to the differential equation $y'' - y' - 6y = 0$ on the interval $(-\infty, \infty)$?

- A. No
- B. Yes

Q3 Are $f_1(x) = e^{-2x}$ and $f_2(x) = e^{3x}$ linearly independent or linearly dependent on $(-\infty, \infty)$?

- A. Linearly independent
- B. Linearly dependent

Q3 Do $f_1(x) = e^{-2x}$ and $f_2(x) = e^{3x}$ form a fundamental set of solutions of the differential equation $y'' - y' - 6y = 0$ on the interval $(-\infty, \infty)$?

- A. Yes
- B. No

Q3

- A. Yes
- B. No

Q4 Consider $y = c_1e^{4x} + c_2e^{5x} + 3e^x$ and the differential equation $y'' - 9y' + 20y = 36e^x$. Which of the following best describes y as a solution to this differential equation on the interval $(-\infty, \infty)$?

- A. y is a two-parameter family of solutions, but not general
- B. y is a general solution
- C. y is not a solution
- D. y is a general solution, but not linearly independent

Q5 Are $f_1(x) = x$, $f_2(x) = x - 1$, and $f_3(x) = x + 4$ linearly independent or linearly dependent on $(-\infty, \infty)$?

- A. Linearly independent
- B. Linearly dependent

Q6 Are $f_1(x) = e^x \cos(5x)$ and $f_2(x) = e^x \sin(5x)$ solutions to the differential equation $y'' - 2y' + 26y = 0$ on the interval $(-\infty, \infty)$?

- A. No
- B. Yes

Are $f_1(x) = e^x \cos(5x)$ and $f_2(x) = e^x \sin(5x)$ linearly independent or linearly dependent on $(-\infty, \infty)$?

Q6 Are $f_1(x) = e^x \cos(5x)$ and $f_2(x) = e^x \sin(5x)$ linearly independent or linearly dependent on $(-\infty, \infty)$?

- A. Linearly dependent
- B. Linearly independent

Q6 Do $f_1(x) = e^x \cos(5x)$ and $f_2(x) = e^x \sin(5x)$ form a fundamental set of solutions of the differential equation $y'' - 2y' + 26y = 0$ on the interval $(-\infty, \infty)$?

- A. No
- B. Yes

Q7 It can be verified that $y_1 = e^{2x}$ and $y_2 = xe^{2x}$ form a fundamental set of solutions of the differential equation $y'' - 4y' + 4y = 0$. It can also be verified that $y_p = x^2e^{2x} + x - 2$ is a particular solution to the differential equation $y'' - 4y' + 4y = 2e^{2x} + 4x - 12$. Using this information, which of the following is the general solution to the differential equation $y'' - 4y' + 4y = 2e^{2x} + 4x - 12$?

- A. $y = c_1e^{2x} + c_2xe^{2x} + x^2e^{2x} + x - 2$
- B. $y = c_1e^{2x} + c_2xe^{2x} + c_3x^2e^{2x} + c_4x - c_5$
- C. $y = c_1e^{2x} + c_2xe^{2x} + c_3\left(x^2e^{2x} + x - 2\right)$
- D. $y = e^{2x} + xe^{2x} + x^2e^{2x} + x - 2$

Are the functions $f_1(x) = e^{x+3}$ and $f_2(x) = e^{x-4}$ linearly dependent or independent?

Q8 Are the functions $f_1(x) = e^{x+3}$ and $f_2(x) = e^{x-4}$ linearly dependent or independent?

- A. Linearly dependent
- B. Linearly independent

Q8 Which of the following best describes the correct choice for part (a)? (Careful!!)

- A. Since the functions are scalar multiples of each other. That is, $f_1 = cf_2$ for some constant c.
- B. Since the Wronskian equals zero for at least one x on $(-\infty, \infty)$.
- C. Since the Wronskian never equals zero on $(-\infty, \infty)$.
- D. Since the only solution to $c_1f_1 + c_2f_2 = 0$ is $c_1 = c_2 = 0$.

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9. (1 point) The function $y_1(x) = e^{7x}$ is a solution to the differential equation $y'' - 14y' + 49y = 0$. Use reduction of order to find another solution y_2 to this differential equation.

$y_2 =$ __________ help (formulas)

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10. (1 point) The function $y_1(x) = \cos(5x)$ is a solution to the differential equation $y'' + 25y = 0$. Use reduction of order to find another solution y_2 to this differential equation.

$y_2 =$ __________ help (formulas)

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11. (1 point) The function $y_1(x) = e^{\frac{2}{3}x}$ is a solution to the differential equation $9y'' - 12y' + 4y = 0$. Use reduction of order to find another solution y_2 to this differential equation.

$y_2 =$ __________ help (formulas)