1. (1 pt) The function $y_p(t) = \ln(3+2t)$, $t > -\frac{3}{2}$, is a particular solution to the differential equation $y'' + 5y = g(t)$. Find $g(t)$.

$g(t) =$ ______

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- `-2*2/[(3+2*t)^2]+5*ln(3+2*t)`

2. (1 pt)

(1) Find a particular solution to the nonhomogeneous differential equation $y'' + 4y' + 5y = 5x + 5e^{-x}$.

$y_p =$ ______

(2) Find the most general solution to the associated homogeneous differential equation. Use c_1 and c_2 in your answer to denote arbitrary constants, and enter them as c1 and c2.

$y_h =$ ______

(3) Find the most general solution to the original nonhomogeneous differential equation. Use c_1 and c_2 in your answer to denote arbitrary constants.

$y =$ ______

Answer(s) submitted:

-
-
-

(incorrect)

Correct Answers:

- `-4*1/5 + 1 x + 2.5 e^(-x) + a e^(-2x) cos(x) + b e^(-2x) sin(x)`
- `c1 e^(-2x) cos(x) + c2 e^(-2x) sin(x)`
- `-4*1/5 + 1 x + 2.5 e^(-x) + c1 e^(-2x) cos(x) + c2 e^(-2x) sin(x)`

3. (1 pt) Consider the differential equation

$$y'' + \alpha y' + \beta y = t + e^{2t}.$$

Suppose the form of the particular solution to this differential equation as prescribed by the method of undetermined coefficients is

$$y_p(t) = A_1 t^2 + A_0 t + B_0 t e^{2t}.$$

Determine the constants α and β.

$\alpha =$ ______

$\beta =$ ______

Answer(s) submitted:

-
-

(incorrect)

Correct Answers:

- `-2`
- `0`

4. (1 pt) Consider the initial value problem

$$y'' + 25y = e^{-t}, \quad y(0) = y_0, \quad y'(0) = y_0'.$$

Suppose we know that $y(t) \to 0$ as $t \to \infty$. Determine the solution and the initial conditions.

$y(t) =$ ______

$y(0) =$ ______

$y'(0) =$ ______

Answer(s) submitted:

-
-
-

(incorrect)

Correct Answers:

- `e^(-t) / 26`
- ` 1 / 26`
- `-1 / 26`

5. (1 pt) Consider the initial value problem

$$y'' - 25y = e^{-t}, \quad y(0) = 1, \quad y'(0) = y_0'.$$

Suppose we know that $y(t) \to 0$ as $t \to \infty$. Determine the solution and the unknown initial condition.

$y(t) =$ ______

$y'(0) =$ ______

Answer(s) submitted:

-
-

(incorrect)
Correct Answers:

- `(-25 / -24) e^(-5 t) + e^(-t) / -24`
- `-5.16667`

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6. (1 pt)

(1) Find a particular solution to the nonhomogeneous differential equation $y'' + 6y' - 7y = e^{3x}$.

$y_p =$ ______

(2) Find the most general solution to the associated homogeneous differential equation. Use c_1 and c_2 in your answer to denote arbitrary constants, and enter them as c1 and c2.

$y_h =$ ______

(3) Find the most general solution to the original nonhomogeneous differential equation. Use c_1 and c_2 in your answer to denote arbitrary constants.

$y =$ ______

Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- `1/20 e^(3 x) + a e^(1 x) + b e^(-7 x)`
- `c1 e^(1 x) + c2 e^(-7 x)`
- `1/20 e^(3 x) + c1 e^(1 x) + c2 e^(-7 x)`

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7. (1 pt)

(1) Find a particular solution to the nonhomogeneous differential equation $y'' - 8y' + 16y = e^{4x}$.

$y_p =$ ______

(2) Find the most general solution to the associated homogeneous differential equation. Use c_1 and c_2 in your answer to denote arbitrary constants and enter them as c1 and c2.

$y_h =$ ______

(3) Find the most general solution to the original nonhomogeneous differential equation. Use c_1 and c_2 in your answer to denote arbitrary constants.

$y =$ ______

Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- `1/2 x^2 e^(4 x) + (a x + b) e^(4 x)`
- `(c1 x + c2) e^(4 x)`
- `1/2 x^2 e^(4 x) + (c1 x + c2) e^(4 x)`

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8. (1 pt)

(1) Find a particular solution to the nonhomogeneous differential equation $y'' + 9y = \cos(3x) + \sin(3x)$.

$y_p =$ ______

(2) Find the most general solution to the associated homogeneous differential equation. Use c_1 and c_2 in your answer to denote arbitrary constants. Enter c_1 as c1 and c_2 as c2.

$y_h =$ ______

(3) Find the solution to the original nonhomogeneous differential equation satisfying the initial conditions $y(0) = 9$ and $y'(0) = 2$.

$y =$ ______

Answer(s) submitted:

-
-
-

(incorrect)
Correct Answers:

- `-1/6 x cos(3 x) + 1/6 x sin(3 x) + a cos(3 x) + b sin(3 x)`
- `c1 cos(3 x) + c2 sin(3 x)`
- `-1/6 x cos(3 x) + 1/6 x sin(3 x) + 9 cos(3 x) + 13/18 sin(`