

1. (1 point) Find an equation of the curve that satisfies

$$\frac{dy}{dx} = 45yx^4$$

and whose y-intercept is 4.

$$y(x) = \underline{\hspace{2cm}}$$

Correct Answers:

- $4 \cdot \exp(9 \cdot x^5)$

2. (1 point) Find the particular solution of the differential equation

$$\frac{dy}{dx} + y \cos(x) = 2 \cos(x)$$

satisfying the initial condition $y(0) = 4$.

Answer: $y = \underline{\hspace{2cm}}$

Your answer should be a function of x .

Correct Answers:

- $2 + 2 \cdot e^{(-\sin(x))}$

3. (1 point)

Find the solution to the differential equation $\frac{dy}{dx} = \frac{4xy}{(\ln y)^6}$ which passes through the point $(0, e)$. Express your answer as $\ln y = \underline{\hspace{2cm}}$

Correct Answers:

- $(4 \cdot (6+1) \cdot x \cdot x/2 + 1)^{1/(6+1)}$

4. (1 point) Solve the differential equation $\frac{dy}{dx} = \frac{6y}{x}$, $x > 0$

Answer: $y(x) = \underline{\hspace{2cm}}$

Note: Use C as your constant and simplify it so it is not negated or multiplied by a number in your solution.

Correct Answers:

- $C \cdot x^6$

5. (1 point) A. Find y in terms of x if

$$\frac{dy}{dx} = x^4 y^{-1}$$

and $y(0) = 4$.

$$y(x) = \underline{\hspace{2cm}}$$

B. For what x -interval is the solution defined?

(Your answers should be numbers or plus or minus infinity. For plus infinity enter "PINF"; for minus infinity enter "MINF".)

The solution is defined on the interval:

$$\underline{\hspace{1cm}} < x < \underline{\hspace{1cm}}$$

Correct Answers:

- $((2 \cdot 8) + (0.4 \cdot (x^{**5})))^{**1/2}$
- -2.09127910518255
- PINF

6. (1 point) Find the solution to the differential equation

$$\frac{dz}{dt} = 6te^{2z}$$

that passes through the origin.

$$z = \underline{\hspace{2cm}}$$

Correct Answers:

- $(-1/2) \cdot \ln(1 - 6 \cdot t^2/2)$

7. (1 point) Solve the initial value problem

$$\frac{dx}{dt} + 5x = \cos(2t)$$

with $x(0) = -1$.

$$x(t) = \underline{\hspace{2cm}}$$

Correct Answers:

- $-1.17241379310345 \cdot 2.71828182845905^{(-5 \cdot t)} + 5/29 \cdot \cos(2 \cdot t)$

8. (1 point) Solve the following initial value problem:

$$t \frac{dy}{dt} + 4y = 3t$$

with $y(1) = 7$.

Find the integrating factor, $u(t) = \underline{\hspace{2cm}}$,

and then find $y(t) = \underline{\hspace{2cm}}$.

Correct Answers:

- t^4
- $(3 \cdot t / (1 + 4)) + 6.4 \cdot (t^{**(-4)})$

9. (1 point) Find the general solution, $y(t)$, which solves the problem below, by the method of integrating factors.

$$5t \frac{dy}{dt} + y = t^4$$

Find the integrating factor, $u(t) = \underline{\hspace{2cm}}$,

and then find $y(t) = \underline{\hspace{2cm}}$. (use C as the unknown constant.)

Correct Answers:

- $t^{1/5}$
- $(t^4)/21 + C \cdot t^{(-1/5)}$

10. (1 point) Solve the initial value problem

$$\frac{dy}{dt} - y = 8e^t + 15e^{4t}$$

with $y(0) = 2$.

$y =$ _____.

Correct Answers:

- $(2 - 5) * \exp(t) + 8 * t * \exp(t) + 5 * \exp(4 * t)$

11. (1 point) Solve the following initial value problem:

$$\frac{dy}{dt} + (0.8)t y = 7t$$

with $y(0) = 5$.

(Find y as a function of t .)

$y =$ _____

Correct Answers:

- $(7 / 0.8) + -3.75 * \exp(-0.8 * t * t / 2)$

12. (1 point) Find the function satisfying the differential equation

$$y' - 3y = -4e^{1t}$$

and $y(0) = 3$.

Correct Answers:

- $2 * \exp(1 * t) + 1 * \exp(3 * t)$