7.2 Verifying Solutions

Calculus

Practice

For each differential equation, find the particular solution th

| Tot each uniterential equation, that the | Pul tict |
|--|----------|
| 1. $\frac{dy}{dx} = 4x + 2$; (-1,3) | |
| y=)4x+2 dx | |
| y= 4x2 +2x+C | |
| y= _ 1 / 1 / 1 / 2 | |
| 3=2(-1)+2(-1)+(| |
| | |
| 3= O +C | |
| 3=C | |
| $\sqrt{=7x}+7x+$ | 2 |
| | |

2.
$$\frac{dy}{dx} = \frac{3}{2-x} + 6x^2$$
; (1,1) $u = 2-x$
 $y = \int \frac{3}{4x} (-du) + \int 6x^2 dx$ $-du = dx$
 $y = -3 \ln |2-x| + \frac{6x^3}{3} + ($
 $| = -3 \ln |2-1| + 2 + ($
 $| = 0 + 2 + ($
 $-1 = C$ $y = -3 \ln |2-x| + 2x^3 - 1$

3.
$$\frac{dy}{dx} = 8\cos(4x)$$
; $(\frac{\pi}{8}, -2)$

$$y = 9 \int \cos(\omega) \left(\frac{dx}{4}\right)$$

$$y = 25in(4x) + C$$

$$-2 = 25in(3x) + C$$

$$-4 = C$$

$$y = 25in(4x) - 4$$

4.
$$\frac{dy}{dx} = 9e^{3x} - 1$$
; (0,7)
 $y = 9 \begin{cases} e^{3x} - 1 \\ - 1 \end{cases}$
 $y = 3 e^{3x} - x + C$
 $y = 3 e^{3x} - x + C$
 $y = 3 + C$
 $y = 3 e^{3x} - x + C$
 $y = 3 e^{3x} - x + C$

6. $\frac{d^2y}{dx^2} = e^{2x} - x$ and $y'(0) = \frac{3}{2}$ and $y(0) = \frac{3}{4}$

5.
$$\frac{d^{2}y}{dx^{2}} = \frac{1}{(2-x)^{2}} + 1 \text{ and } y'(3) = 6 \text{ and } y(1) = 4$$

$$\frac{dy}{dx} = \int u^{-2} \left(\frac{du}{-1}\right) + \int 1 dx$$

$$\frac{dy}{dx} = -\frac{1}{1-1} + \frac{1}{1-1} + \frac{1}{1-$$

$$\frac{dy}{dx} = \int u^{2}(\frac{dx}{2}) + \int 1 dx \qquad \frac{dy}{dx} = \int e^{-\frac{1}{2}} + x + C \qquad \frac{dy}{dx} = \int e^{-\frac{1}{2}} + x + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - \frac{1}{2} x^{2} + C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - C \qquad \frac{dy}{dx} = \frac{1}{2} e^{2x} - C \qquad \frac{dy}{dx} = \frac{1}{$$

4=4ex-6x3+x+2

Find the value of k of each equation that would be a solution to the given differential equation.

7.
$$y = 3ke^{2x} + \cos(4x)$$

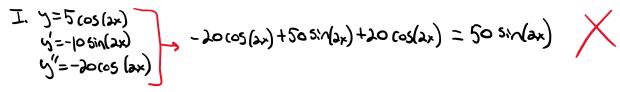
Diff Eq: $\frac{y''}{2} + 8y = 15e^{2x}$
 $y' = 6ke^{2x} - 45in(4x)$
 $y'' = 12ke^{2x} - 16cos(4x)$
 $12ke^{2x} - 16cos(4x) + 8[3ke^{2x} + cos(4x)] = 15e^{2x}$
 $6ke^{2x} - 8cos(4x) + 24ke^{2x} + 8cos(4x) = 15e^{2x}$
 $30ke^{2x} = 15e^{2x}$
 $30e^{2x} = 30e^{2x}$

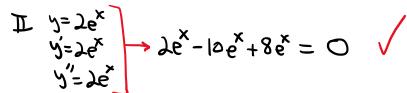
9.
$$y = e^{-3x} + ke^{4x}$$

Diff Eq: $3y' + y'' = -14e^{4x}$
 $y' = -3e^{-3x} + 4ke^{4x}$
 $y'' = 9e^{-3x} + 16ke^{4x}$
 $3[-3e^{-3x} + 4ke^{4x}] + [9e^{-3x} + 16ke^{4x}] = -14e^{4x}$
 $-9e^{-3x} + 12ke^{4x} + 9e^{-3x} + |6ke^{4x}] = -14e^{4x}$
 $28ke^{4x} = -14e^{4x}$

9.
$$y = e^{-3x} + ke^{4x}$$
Diff Eq: $3y' + y'' = -14e^{4x}$
 $y' = -3e^{-3x} + 16ke^{4x}$
 $y'' = 9e^{-3x} + 16ke^{-3x}$
 $y'' = 9e^{3$

- 11. Of the following, which are solutions to the differential equation y'' 5y' + 4y = 0
 - $I. y = 5\cos(2x)$
 - II. $y = 2e^x$
 - III. $y = Ce^{4x}$, where C is a constant.





(B) II only

(A)

- (C) III only
- (D) I and II only

I only

(E) II and III only

$$\frac{111}{3} = (e^{4x})$$

$$\frac{1}{3} = 4 \cdot e^{4x}$$

$$\frac{1}{3} = 16 \cdot e^{4x}$$

$$\frac{1}{6} = 16 \cdot e^{4x}$$

$$\frac{1}{6} = 16 \cdot e^{4x}$$

12. Consider the differential equation $\frac{dy}{dx} = (y-4)^3 \sin\left(\frac{\pi x}{2}\right)$. There is a horizontal line with equation y = c that satisfies this differential equation. Find the value of c.

y = 4. A horizontal line exists only if the slope (derivative) is zero. This differential equation will equal zero when y = 4.