Unit 6 "Verify Solutions" Differential Equations AP Review WS #2

Verifying Solutions for Differential Equations:

0. The function $y = e^{3x} - 5x + 7$ is a solution to which of the following differential equations?

    (A) $y'' - 3y' - 15 = 0$

    (B) $y'' - 3y' + 15 = 0$

    (C) $y'' - y' - 5 = 0$

    (D) $y'' - y' + 5 = 0$

1. If $\frac{dy}{dx} = y \sec^2 x$ and $y = 5$ when $x = 0$, then $y =$

    (A) $e^{\tan x} + 4$

    (B) $e^{\tan x} + 5$

    (C) $5e^{\tan x}$

    (D) $\tan x + 5$

    (E) $\tan x + 5e^x$

2. Which of the following is the solution to the differential equation $\frac{dy}{dx} = e^{y+x}$ with the initial condition $y(0) = -\ln 4$?

(A) $\quad y = -x - \ln 4$

(B) $\quad y = x - \ln 4$

(C) $\quad y = -\ln(-e^x + 5)$

(D) $\quad y = -\ln(e^x + 3)$

(E) $\quad y = \ln(e^x + 3)$

3. A curve has slope $2x + 3$ at each point (x, y) on the curve. Which of the following is an equation for this curve if it passes through the point $(1, 2)$?

(A) $\quad y = 5x - 3$

(B) $\quad y = x^2 + 1$

(C) $\quad y = x^2 + 3x$

(D) $\quad y = x^2 + 3x - 2$

(E) $\quad y = 2x^2 + 3x - 3$

4. For what value of k, if any, will $y = k\sin(5x) + 2\cos(4x)$ be a solution to the differential equation $y'' + 16y = -27\sin(5x)$?

(A) -27

(B) $-\dfrac{9}{5}$

(C) 3

(D)   There is no such value of k.

5. Of the following, which are solutions to the differential equation $y'' - 10y' + 9y = 0$?

I. $y = 2\sin(3x)$
II. $y = 5e^x$
III. $y = Ce^{9x}$, where C is a constant.

(A) I only

(B) II only

(C) III only

(D) II and III only

6. For what value of k, if any, is $y = e^{2x} + ke^{-3x}$ a solution to the differential equation
$4y - y'' = 10e^{-3x}$?

    (A) -2

    (B) $\dfrac{10}{3}$

    (C) 10

    (D)   There is no such value of k.

7. For what value of k, if any, will $y = ke^{-2x} + 4\cos(3x)$ be a solution to the differential
equation $y'' + 9y = 26e^{-2x}$?

    (A) 2

    (B) $\dfrac{13}{5}$

    (C) 26

    (D)   There is no such value of k.

8. Of the following, which are solutions to the differential equation $y'' - 6y' + 8y = 0$?

$$\text{I. } y = 2 \sin (4x)$$
$$\text{II. } y = 3e^{2x}$$
$$\text{III. } y = Ce^{4x}, \text{ where } C \text{ is a constant.}$$

(A) I only

(B) II only

(C) III only

(D) II and III only

9. For what value of k, if any, is $y = e^{-2x} + ke^{4x}$ a solution to the differential equation $y - \dfrac{y''}{4} = 5e^{4x}$?

(A) $-\dfrac{5}{3}$

(B) $\dfrac{20}{3}$

(C) 5

(D) There is no such value of k.