

7.2 Verifying Solutions for Differential Equations – All examples from AP Classroom

**** Watch the March 26, 2020 video to see how to work them. ****

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) $\tan x + 5e^x$

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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) $y = -x - \ln 4$
- (B) $y = x - \ln 4$
- (C) $y = -\ln(-e^x + 5)$
- (D) $y = -\ln(e^x + 3)$
- (E) $y = \ln(e^x + 3)$

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) $y = 5x - 3$
 - (B) $y = x^2 + 1$
 - (C) $y = x^2 + 3x$
 - (D) $y = x^2 + 3x - 2$
 - (E) $y = 2x^2 + 3x - 3$
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7.2 Verifying Solutions for Differential Equations – All examples from AP Classroom

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) $-\frac{9}{5}$
- (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
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7.2 Verifying Solutions for Differential Equations – All examples from AP Classroom

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) $\frac{10}{3}$
- (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) $\frac{13}{5}$
 - (C) 26
 - (D) There is no such value of k .
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8. Of the following, which are solutions to the differential equation $y'' - 6y' + 8y = 0$?

I. $y = 2 \sin(4x)$

II. $y = 3e^{2x}$

III. $y = Ce^{4x}$, where C 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

$$y - \frac{y''}{4} = 5e^{4x} ?$$

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

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

(C) 5

(D) There is no such value of k .

Answers:

0. A

1. C

2. C

3. D

4. C

5. D

6. A

7. A

8. D

9. A