

Ch 6 MC Practice**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- _____ 1. Which of the following is a solution of the differential equation $7y'' + 7y = 0$?
- a. $e^{-3x} + e^x$
 - b. $-C_1 e^{-x} \cos x + C_2 e^{-x} \sin x$
 - c. $-C_1 \cos x + C_2 \sin x$
 - d. $-\cos x \ln |\sec x + \tan x|$
 - e. $x^2 e^x - 3x^2$
- _____ 2. Which of the following is a solution of the differential equation $xy' - 4y = x^5 e^x$?
- a. $y = 4x^5 e^{2x}$
 - b. $y = 6e^{2x} - 7 \sin 2x$
 - c. $y = x^4 e^x$
 - d. $y = 5e^{-2x}$
 - e. $y = \ln x$
- _____ 3. Find the particular solution of the differential equation $3x + 20yy' = 0$ that satisfies the initial condition $y = 5$ when $x = 2$, where $3x^2 + 20y^2 = C$ is the general solution.
- a. $3x^2 + 20y^2 = 504$
 - b. $3x^2 + 20y^2 = 155$
 - c. $3x^2 + 20y^2 = 112$
 - d. $3x^2 + 20y^2 = 37$
 - e. $3x^2 + 20y^2 = 512$

_____ 4. Use integration to find a general solution of the differential equation.

$$\frac{dy}{dx} = 2x^2 + 5x$$

- a. $y = 2x^3 + 5x^2 + C$
- b. $y = 2x^2 + 5x + C$
- c. $y = 4x + 5 + C$
- d. $y = \frac{2}{3}x^3 + \frac{5}{2}x^2 + C$
- e. $y = 2x^2 + 5 + C$

_____ 5. Use integration to find a general solution of the differential equation $\frac{dy}{dx} = \frac{3x}{3+x^2}$.

- a. $y = \frac{3}{2} \ln \left(\left| 3+x^2 \right| \right) + C$
- b. $y = \frac{3}{2x} \ln \left(\left| 6+x^2 \right| \right) + C$
- c. $y = \frac{6}{x^2} \ln \left(\left| 3+x^2 \right| \right) + C$
- d. $y = \frac{3}{x \ln \left(\left| 3+x^2 \right| \right)} + C$
- e. $y = \frac{3x^2}{\ln \left(\left| 3+x^2 \right| \right)} + C$

_____ 6. Use integration to find a general solution of the differential equation $\frac{dy}{dx} = 13x \cos(8x^2)$.

a. $y = \frac{13x \sin(16x^2)}{2x} + C$

b. $y = \frac{13x \cos(8x^2)}{16} + C$

c. $y = \frac{13 \sin(8x^2)}{16} + C$

d. $y = \frac{13 \cos(8x^2)}{16x} + C$

e. $y = \frac{13 \sin(16x^2)}{4} + C$

_____ 7. Use integration to find a general solution of the differential equation.

$$\frac{dy}{dx} = x\sqrt{4-x^2}$$

a. $y = -\frac{1}{3}x(4-x^2)^{\frac{3}{2}} + C$

b. $y = -\frac{1}{5}x(4-x^2)^{\frac{5}{2}} + C$

c. $y = -\frac{1}{3}(4-x^2)^{\frac{3}{2}} + C$

d. $y = \frac{1}{5}x(4-x^2)^{\frac{5}{2}} + C$

e. $y = \frac{1}{3}(4-x^2)^{\frac{3}{2}} + C$

_____ 8. Use integration to find a general solution of the differential equation .

$$\frac{dy}{dx} = x\sqrt{x-15}$$

a. $y = 2(x-15)^2(30-x) + C$

b. $y = \frac{2}{5}(x-15)^3(5+x) + C$

c. $y = \frac{1}{5}(x-15)^{2/3}(10-x) + C$

d. $y = (x-15)^{3/2}(15+x) + C$

e. $y = \frac{2}{5}(x-15)^{3/2}(10+x) + C$

_____ 9. Use integration to find a general solution of the differential equation.

$$\frac{dy}{dx} = x^{10}e^{x^{11}}$$

a. $y = \frac{1}{10}e^{x^{11}} + C$

b. $y = \frac{1}{11}e^{x^{11}} + C$

c. $y = \frac{x^{11}}{11}e^{x^{11}} + C$

d. $y = 11e^{x^{11}} + C$

e. $y = 10e^{x^{11}} + C$

_____ 10. Solve the differential equation.

$$\frac{dy}{dx} = x+8$$

a. $y = \frac{1}{2}x^2 - 8x + C$

b. $y = \frac{1}{2}x^2 + 8x + C$

c. $y = x^2 - 8x + C$

d. $y = -\frac{1}{2}x^2 - 8x + C$

e. $y = x^2 + 8x + C$

_____ 11. Solve the differential equation.

$$y' = \frac{-2x}{y}$$

- a. $y^2 = 2x^2 + C$
- b. $2 \ln y = -2x^2 + C$
- c. $2 \ln y = 2x^3 + C$
- d. $y^2 = -2x^2 + C$
- e. $y^2 = -2x^3 + C$

_____ 12. Solve the differential equation $y' = \frac{\sqrt{x}}{2y}$.

- a. $2y^2 = 4x^{\frac{3}{2}} + C$
- b. $6y^2 = 4x^{\frac{3}{2}} + C$
- c. $6y^2 = 2x^{\frac{3}{2}} + C$
- d. $4y^2 = 6x^{\frac{3}{2}} + C$
- e. $4y^2 = 2x^{\frac{3}{2}} + C$

_____ 13. Write and solve the differential equation that models the following verbal statement:

The rate of change of Y with respect to s is proportional to $50 - s$.

- a. $\frac{dY}{ds} = k(50 - s)^{-1}$, $Y = -k \ln(50 - s)^2 + C$
- b. $\frac{dY}{ds} = k(50 - s)^{-1}$, $Y = -k(50 - s) + C$
- c. $\frac{dY}{ds} = k(50 - s)$, $Y = -\frac{k}{2}(50 - s)^2 + C$
- d. $\frac{dY}{ds} = k(50 - s)^3$, $Y = -\frac{k}{4}(50 - s)^4 + C$
- e. $\frac{dY}{ds} = k(50 - s)^2$, $Y = -\frac{k}{3}(50 - s)^3 + C$

_____ 14. Find the function $y = f(t)$ passing through the point $(0, 15)$ with the first derivative $\frac{dy}{dt} = \frac{1}{4}t$.

a. $y(t) = \frac{t^2}{8} + 15$

b. $y(t) = 8t^2 + 15$

c. $y(t) = 4t + 15$

d. $y(t) = \frac{t^2}{4} + 15$

e. $y(t) = \frac{t}{4} + 15$

_____ 15. Find the function $y = f(t)$ passing through the point $(0, 12)$ with the first derivative $\frac{dy}{dt} = \frac{6}{7}y$.

a. $y(t) = e^{\frac{6}{7}t^2} + 12$

b. $y(t) = \frac{6}{7}t^2 + 12$

c. $y(t) = 12e^{\frac{6}{7}t^2}$

d. $y(t) = 12e^{\frac{6}{7}t}$

e. $y(t) = e^{\frac{6}{7}t} + 12$

_____ 16. Write and solve the differential equation that models the following verbal statement. Evaluate the solution at the specified value of the independent variable, rounding your answer to four decimal places:

The rate of change of P is proportional to P . When $t = 0$, $P = 60$ and when $t = 5$, $P = 84$. What is the value of P when $t = 11$?

a. $P(11) = 131.9962$

b. $P(11) = 129.5362$

c. $P(11) = 122.0362$

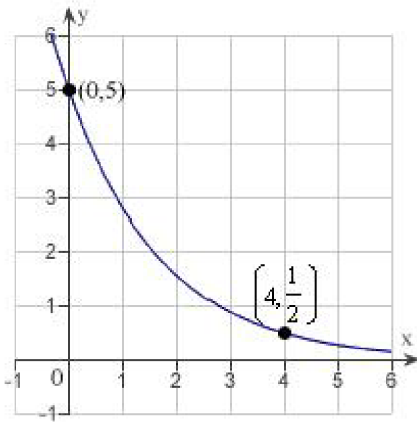
d. $P(11) = 125.7862$

e. $P(11) = 116.8662$

Name: _____

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- _____ 17. The rate of change of N is proportional to N . When $t = 0, N = 200$ and when $t = 1, N = 360$. What is the value of N when $t = 4$? Round your answer to three decimal places.
- a. 2,129.520
 - b. 2,099.520
 - c. 2,049.520
 - d. 491.383
 - e. 262,440.000
- _____ 18. Find the exponential function $y = Ce^{kx}$ that passes through the two given points. Round your values of C and k to four decimal places.



- a. $y = 5e^{-0.4159x}$
- b. $y = 5e^{-0.5756x}$
- c. $y = 5e^{0.2266x}$
- d. $y = 5e^{0.2763x}$
- e. $y = 5e^{-3.6889x}$

_____ 19. Find the general solution of the differential equation $\frac{dy}{dx} = \frac{5x^2}{8y^2}$.

a. $y = \frac{5}{8}x^3 + C$

b. $y = \sqrt[3]{\frac{5}{8}x^3 + C}$

c. $y = \sqrt{\frac{8}{5}x^3 + C}$

d. $y = \sqrt[3]{\frac{x^2}{8} + C}$

e. $y = \sqrt[3]{5x^3 + 8C}$

_____ 20. Find the particular solution of the differential equation $\frac{dr}{ds} = e^{r-7s}$ that satisfies the initial condition $r(0) = 0$.

a. $r = \ln\left(7 + e^{-7s}\right) + C$

b. $r = \ln(7) - \ln\left(6 + e^{-7s}\right)$

c. $r = e^{r-7s}$

d. $r = \ln\left(\frac{8 + e^{-7s}}{7}\right)$

e. $r = \left(1 + e^{-7s}\right)^7$

Name: _____

ID: A

_____ 21. Find an equation of the graph that passes through the point (7, 3) and has the slope $y' = \frac{5y}{2x}$.

a. $y = 3(7x)^{\frac{2}{5}}$

b. $y = xe^{\frac{5}{2} + \frac{7}{3}}$

c. $y = 3\left(\frac{x}{7}\right)^{\frac{5}{2}}$

d. $y = 7\left(\frac{5x}{2}\right)^3$

e. $y = \frac{2}{5x} - \ln(7x) + 3$

Ch 6 MC Practice Answer Section

MULTIPLE CHOICE

1. ANS: C PTS: 1 DIF: Medium REF: Section 6.1
OBJ: Identify the solution of a differential equation MSC: Skill
2. ANS: C PTS: 1 DIF: Medium REF: Section 6.1
OBJ: Identify the solution of a differential equation MSC: Skill
NOT: Section 6.1
3. ANS: E PTS: 1 DIF: Easy REF: Section 6.1
OBJ: Identify the particular solution of a differential equation
MSC: Skill
4. ANS: D PTS: 1 DIF: Medium REF: Section 6.1
OBJ: Identify the general solution of a differential equation MSC: Skill
5. ANS: A PTS: 1 DIF: Easy REF: Section 6.1
OBJ: Identify the general solution of a differential equation MSC: Skill
6. ANS: C PTS: 1 DIF: Medium REF: Section 6.1
OBJ: Identify the general solution of a differential equation MSC: Skill
7. ANS: C PTS: 1 DIF: Medium REF: Section 6.1
OBJ: Identify the general solution of a differential equation MSC: Skill
8. ANS: E PTS: 1 DIF: Medium REF: Section 6.1
OBJ: Identify the general solution of a differential equation MSC: Skill
9. ANS: B PTS: 1 DIF: Medium REF: Section 6.1
OBJ: Identify the general solution of a differential equation MSC: Skill
10. ANS: B PTS: 1 DIF: Medium REF: Section 6.2
OBJ: Identify the general solution of a differential equation MSC: Skill
11. ANS: D PTS: 1 DIF: Medium REF: Section 6.2
OBJ: Identify the general solution of a differential equation MSC: Skill
12. ANS: B PTS: 1 DIF: Medium REF: Section 6.2
OBJ: Identify the general solution of a differential equation MSC: Skill
13. ANS: C PTS: 1 DIF: Medium REF: Section 6.2
OBJ: Create and solve a differential equation model MSC: Application
14. ANS: A PTS: 1 DIF: Easy REF: Section 6.2
OBJ: Identify a function given its derivative and a point that it passes through
MSC: Skill
15. ANS: D PTS: 1 DIF: Easy REF: Section 6.2
OBJ: Identify a function given its derivative and a point that it passes through
MSC: Skill
16. ANS: D PTS: 1 DIF: Medium REF: Section 6.2
OBJ: Create and solve a differential equation model MSC: Application
17. ANS: B PTS: 1 DIF: Medium REF: Section 6.2
OBJ: Create and solve a differential equation model MSC: Skill
18. ANS: B PTS: 1 DIF: Easy REF: Section 6.2
OBJ: Identify an exponential equation given its graph MSC: Skill

19. ANS: B PTS: 1 DIF: Medium REF: Section 6.3
OBJ: Calculate the general solution of the given differential equation
MSC: Application
20. ANS: B PTS: 1 DIF: Medium REF: Section 6.3
OBJ: Calculate the particular solution of the given differential equation with the given initial solution
MSC: Application
21. ANS: C PTS: 1 DIF: Medium REF: Section 6.3
OBJ: Calculate the equation of a graph with a given slope and passing through the given point
MSC: Application