7 - Which of the following is a particular solution of the differential equation of $x^2(3y' + 2y^2) = 2$ in the type of $\frac{k}{x}$?

a) $\frac{-1}{2x}$

b) $\frac{1}{x}$

c) $\frac{-2}{x}$

d) $\frac{-1}{x}$

e) $\frac{1}{2x}$

8 - What is , if $(3x^2 - y^2)dx - 2xydy = 0$ and $y(0) = 0$?

a) 1

b) 5

c) 2

d) 3

e) 4

9 - For the differential equation $(2xy + 5y^2)dx + (3x^2 + 20xy)dy = 0$, what should n be if an integral factor is $\lambda = y^n$?

a) 1

b) -2

c) -1

d) 2

e) -4

10 - It is given that the differential equation , is transformed to the differential equation $x\frac{du}{dx} = u(au^2 + bu + c)$, where a, b, and c are real constants, under the substitution $u = -4xy$. Which of the following is the value of $a + b + c$?

a) $-\frac{5}{4}$

b) $\frac{5}{8}$

c) $-\frac{2}{3}$

d) $\frac{1}{8}$

e) 1

4 - Find the general solution of the equation
$(4x + 3y + 5)dx + (3x + 4y - 5)dy = 0.$

a) $(y+5)^2 + 3(x+5)(y+5) + (x+5)^2 = c$

b) $2(y-5)^2 + 3(x-5)(y-5) + 2(x-5)^2 = c$

c) $4(y+5)^2 + 6(x-5)(y+5) + 4(x-5)^2 = c$

d) $4(y-5)^2 + 6(x+5)(y-5) + 4(x+5)^2 = c$

e) $2(y-5)^2 + 3(x-5)(y-5) + 2(x+5)^2 = c$

5 - Which of the following is the solution of the initial value problem
$y' + \left(\frac{1}{x} + \frac{1}{3}\right) y = 1,\ y(1) = 1$?

a) $y = 2 - \frac{6}{x} + \frac{5e^{1/3}}{xe^{x/3}}$

b) $y = 2 - \frac{2}{x} + \frac{e^3}{xe^{3x}}$

c) $y = 3 - \frac{1}{x} - \frac{e^{1/3}}{xe^{x/3}}$

d) $y = 3 - \frac{9}{x} + \frac{7e^{1/3}}{xe^{x/3}}$

e) $y = 5 - \frac{1}{x} - \frac{3e^3}{xe^{3x}}$

6 - For which value of $a + b$ is $y^{\frac{-1}{2}}(x) = e^{\frac{5x^2}{4}}\left(\frac{-5}{12}x^{\frac{-3}{2}} + c\right)$ a general solution of the differential equation of $\frac{dy}{dx} + 5xy = bx^{\frac{-5}{2}} e^{ax^2} y^{\frac{3}{2}}$?

a) 0

b) $\frac{-5}{4}$

c) $\frac{5}{4}$

d) $\frac{-4}{5}$

e) $\frac{4}{5}$

1 - If the differential equation $(y')^2 = ay$ with the lowest order that accepts the solution of curve family $y = 3(x - c)^2$, then what should a be?

a) 12
b) -3
c) -6
d) 6
e) 3

2 - What is , if $(x + y^2x)dx - (y + x^2y)dy = 0$ and $y(0) = 0$?

a) 8
b) 9
c) 6
d) 10
e) 7

3 - Find the particular solution of the differential equation given by $9xdx + 9ydy = ydx - xdy$ with $y(3) = 0$.

a) $arctan(x^2 + y^2) + 9ln(y/x) = arctan9$
b) $arctan(y/x) + (9/2)ln(x^2 + y^2) = 9ln3$
c) $arctan(x^2 + y^2) + 18ln(y/x) = arctan9$
d) $arctan(y/x) + 18ln(x^2 + y^2) = 36ln3$
e) $arctan(x/y) + 9ln(x^2 + y^2) = 18ln3$