PRINTABLE VERSION

Practice Test 1

You scored 10 out of 100

Question 1

Your answer is INCORRECT.

The function

$$y = \frac{C}{x^4} - 2$$

is the general solution of

a) $y'' - 4y - 8 = 0$

b) $y' + 4xy + 8 = 0$

c) $xy' + 4y + 16 = 0$

d) $y'' = \frac{20}{x^6}$

e) $xy' + 4y + 8 = 0$

f) None of the above.

Question 2

Your answer is CORRECT.

The function

$$y = C_1 \cos(4x) + C_2 \sin(4x)$$

is the general solution of

a) $y''' + 4y' + 16y = 0$

b) $y'' - 16y = 0$

c) $y'' - 8y' + 16y = 0$

d) $y'' + 16y = 0$

e) $y'' + 4y' + 16y = 0$

f) None of the above.

Question 3

Your answer is INCORRECT.

The function

$$y = C_1 e^{2x} + C_2 e^{-4x}$$

is the general solution of

a) $y'' + 2y' - 8y = 0$

b) $y'' - 2y' - 8y = 0$

c) $y'' - 2y' - 4y = 0$

d) $y'' + 2y' + 8y = 0$

e) $y' - 2y = 0$

f) None of the above.

Question 4

Your answer is INCORRECT.

Give the differential equation that has

$$y^2 = Cx^3 - 1$$

as its general solution.

a) $y' = \frac{3y^2 + 3}{(2xy)}$

b) $y' = \frac{3y^2 - 3}{(2xy)}$

c) $y' = \frac{3y^2 - 6}{(2xy)}$

d) $y' = \frac{2y^2 + 3}{(3xy)}$

e) $y' = \frac{3y^2 + 1}{(3xy)}$

f) None of the above.

Question 5

Your answer is CORRECT.

Give the general solution of

$$x\,y' + 2\,y = \frac{4\,e^{3\,x}}{x}$$

a) $y = \frac{4}{3}\,e^{3\,x} + C$

b) $y = \frac{4}{3}\,\frac{e^{3\,x}}{x^2} + \frac{C}{x^2}$

c) $y = \frac{4}{3}\,x^2\,e^{3\,x} + C\,x^2$

d) $y = \frac{4\,e^{3\,x}}{x^2} + \frac{C}{x^2}$

e) $y = \frac{4}{3}\,\frac{e^{3\,x}}{x} + \frac{C}{x}$

f) None of the above.

Question 6

Your answer is INCORRECT.

Find the general solution of

$$x\,y' + y = 2\,x$$

a) $y = x + \frac{C}{x}$

b) $y = 2\,x + C\,x$

c) $y = x + C\,x$

d) $y = 2\,x^2 + \frac{C}{x}$

e) $y = x^2 + \frac{C}{x}$

f) None of the above.

Question 7

Your answer is INCORRECT.

Give the solution to the initial value problem

$$\left[\begin{array}{c} y' + \frac{3y}{x} = -\frac{1}{x} \\ y(1) = -4 \end{array}\right]$$

a) $y = -1 + \frac{11}{3x^3}$

b) $y = -\frac{1}{3} - \frac{11}{3x^3}$

c) $y = -\frac{1}{3} + \frac{1}{3x^3}$

d) $y = -1 - \frac{13}{3x^3}$

e) $y = -\frac{1}{3} - \frac{13}{3x^3}$

f) None of the above.

Question 8

Your answer is INCORRECT.

Find the general solution of

$$xy' - y = \frac{5}{4}x\ln(x)$$

a) $y = \frac{5}{8}x(\ln(x))^2 + C$

b) $y = \frac{5}{8}x(\ln(x))^2 + Cx$

c) $y = \frac{5}{8}x\ln(x) + Cx$

d) $y = \frac{5}{4}x\ln(x) + C$

e) $y = \frac{5}{4}x(\ln(x))^2 + Cx$

f) None of the above.

Question 9

Your answer is INCORRECT.

Give the general solution to

$$-y' + \frac{4y}{x} = x y^2$$

a) $y = \frac{1}{6} x + \frac{C}{x^4}$

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

c) $\frac{1}{y} = \frac{1}{5} x + \frac{C}{x^4}$

d) $y = \frac{1}{6} x^2 + \frac{C}{x^4}$

e) $\frac{1}{y} = \frac{1}{6} x^2 + \frac{C}{x^4}$

f) None of the above.

Question 10

Your answer is INCORRECT.

Give the general solution to

$$y' = \frac{x^2 y^5 + 3x^2}{y^4}$$

a) $y^4 = 3 + C e^{\frac{5}{2} x}$

b) $y^5 = -3 + C e^{\frac{5}{3} x^3}$

c) $y^5 = -3 + C e^{\frac{4}{3x}}$

d) $y = 3 + C e^{\frac{5}{3x^3}}$

e) $y^5 = -3 + C e^{2x^3}$

f) None of the above.

Question 11

Your answer is INCORRECT.

An advertising company designs a campaign to introduce a new product to a metropolitan area of population 1 Million people. Let $P(t)$ denote the number of people (in millions) who become aware of the product by time t. Suppose that P increases at a rate proportional to the number of people still unaware of the product. The company determines that no one was aware of the product at the beginning of the campaign, and that 30% of the people were aware of the product after 50 days of advertising. The number of people who become aware of the product at time t is:

a) $P(t) = 1 - e^{-\frac{1}{50}t}$

b) $P(t) = e^{-\frac{1}{50}t}$

c) $P(t) = 1 - e^{-\frac{3}{5}t}$

d) $P(t) = \left(\frac{3}{10}\right)^{-\frac{1}{50}t}$

e) $P(t) = 1 - \left(\frac{7}{10}\right)^{\frac{1}{50}t}$

f) None of the above.

Question 12

Your answer is INCORRECT.

Give the family of orthogonal trajectories of

$$-5y = Cx^6$$

a) $-5x^2 + 6y^2 = C$

b) $-\frac{1}{5}x^2 - 6y^2 = C$

c) $\frac{1}{6}x^2 - 5y^2 = C$

d) $x^2 + 6y^2 = C$

e) $x^2 - 5y^2 = C$

f) None of the above.

Question 13

Your answer is INCORRECT.

Give the family of orthogonal trajectories of

$$y = Cx^3 - 4$$

a) $x^2 + 3y^2 - 24y = C$

b) $x^2 - 3y^2 + 24y = C$

c) $x^2 + 3y^2 + 24y = C$

d) $x^2 + 3y^2 + 24x = C$

e) $2x^2 + 6y^2 + 12y = C$

f) None of the above.

Question 14

Your answer is INCORRECT.

Give the general solution to

$$x^2 y' + 3xy = \frac{\sin(2x)}{x}$$

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

b) $y = \frac{1}{2}\frac{\cos(2x)}{x^3} + \frac{C}{x^3}$

c) $y = -\frac{1}{2}\cos(2x)\,x^3 + Cx^3$

d) $y = -\frac{1}{2}\frac{\cos(2x)}{x^3} + Cx^3$

e) $y = \frac{1}{2}\cos(3x)\,x^3 + Cx^3$

f) None of the above.

Question 15

Your answer is INCORRECT.

There are functions of the form x^r that solve the differential equation

$$x^2 y'' + 7 x y' + 8 y = 0$$

Give the solution to the initial value problem

$$\left[x^2 y'' + 7 x y' + 8 y = 0 \quad y(1) = 0 \quad y'(1) = -5 \right]$$

a) $y = \frac{5}{2 x^4} - \frac{1}{2 x^2}$

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

c) $y = \frac{5}{2 x^4} - \frac{5}{2 x^2}$

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

e) $y = \frac{1}{2 x^4} - \frac{5}{2 x^2}$

f) None of the above.

Question 16

Your answer is INCORRECT.

Given the differential equation

$$y'' - \left(\frac{3}{x}\right) y' - \left(\frac{4}{x^2}\right) y = 0$$

Find two values of r such that $y = x^r$ is a solution of the equation.

a) $r = \left\{-\frac{1}{2}, \frac{9}{2}\right\}$

b) $r = \left\{\frac{9}{2}, \frac{3}{2} - 2\sqrt{2}\right\}$

c) $r = \{2 - 2\sqrt{2}, 2 + 2\sqrt{2}\}$

d) $r = \{-1, 4\}$

e) $r = \{2 - \sqrt{6}, 2 + \sqrt{6}\}$

f) None of the above.

Question 17

Your answer is INCORRECT.

Give the general solution to

$$y'' - 4y' + 20y = 0$$

a) $y = C_1 \cos(4x) - C_2 \sin(4x)$

b) $y = C_1 e^{-4x} + C_2 e^{-4x}$

c) $y = e^{2x}\left(C_1 \cos(4x) - C_2 \sin(4x)\right)$

d) $y = e^{-4x}\left(C_1 \cos(2x) + C_2 \sin(2x)\right)$

e) $y = C_1 \cos(2x) + C_2 \sin(2x)$

f) None of the above.

Question 18

Your answer is INCORRECT.

Give the general solution to

$$y'' + 4y' - 5y = 0$$

a) $y = C_1 e^{-5x} + C_2 e^{-x}$

b) $y = C_1 e^{5x} + C_2 e^{x}$

c) $y = C_1 e^{-5x} + C_2 e^{x}$

d) $y = C_1 e^{5x} + C_2 e^{-x}$

e) $y = C_1 e^{-5x} + C_2 x e^{-5x}$

f) None of the above.

Question 19

Your answer is INCORRECT.

The function

$$2\,x\,e^{-3\,x}$$

is a solution to a second order linear homogenous differential equation with constant coefficients. Give the differential equation.

a) $y'' + 4\,y' + 4\,y = 0$

b) $y'' + y' - 6\,y = 0$

c) $y'' - 6\,y' + 9\,y = 0$

d) $y'' + 6\,y' + 9\,y = 0$

e) $y'' - 4\,y' + 4\,y = 0$

f) None of the above.

Question 20

Your answer is INCORRECT.

Find the solution of the initial value problem:

$$[\,y'' - 2\,y' - 24\,y = 0,\quad y(0) = 1,\quad y'(0) = -2\,]$$

a) $y = -\frac{1}{5}\,e^{6\,x} - \frac{4}{5}\,e^{-4\,x}$

b) $y = \frac{4}{5}\,e^{6\,x} + \frac{1}{5}\,e^{-4\,x}$

c) $y = \frac{1}{5}\,e^{6\,x} - \frac{4}{5}\,e^{-4\,x}$

d) $y = \frac{4}{5}\,e^{6\,x} - \frac{1}{5}\,e^{-4\,x}$

e) $y = \frac{1}{5}\,e^{6\,x} + \frac{4}{5}\,e^{-4\,x}$

f) None of the above.