

QUIZ-1st

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1) $y' = e^{-x}$

(1) It is an *ordinary* or *partial* differential equation of *first* or *second* order.

(pick up your answers, 5 scores for each)

(2) Try to get its general solution by direct integration (10 scores)

(3) Verify your answer by substitution (10 scores)

(4) Try to get the particular solution corresponding to the initial solution $y(0)=2$
(10 scores)

(5) Plot the graph of the particular solution, namely an *integral curve* of the equation
(20 scores) (hints: $x=0, y=?; x \rightarrow \infty, y \rightarrow ?$)

2) Verify the given function is a solution of the differential equation
(10 scores for each)

(1) $2yy' = 1; \varphi(x) = \sqrt{x-1}$ for $x > 1$

(2) $y' = -\frac{2y + e^x}{2x}$ for $x > 0; \varphi(x) = \frac{C - e^x}{2x}$

(3) $y' + y = 2; \varphi(x) = 2 + ke^{-x}$

(4) $y' = \frac{y}{x} + 1; \varphi(x) = x \ln(x) + Cx$ for all $x > 0$

3) Verify by implicit differentiation that the given equation implicitly defines a solution of the differential equation (10 scores)

$$y^2 + xy - 2x^2 - 3x - 2y = C; \quad y - 4x - 3 + (x + 2y - 2)y' = 0$$