SmartKalike

CBSE Class 12 · Maths

Differential Equations

10 most probable questions for Boards 2027

Q1. 0.5 marks · Very short answer

For the differential equation $(dy/dx)^2 + y = x$, determine whether its degree is defined, and find it if defined.

Answer

The equation is a polynomial equation in its derivatives.
Highest-order derivative: dy/dx
∴ Degree is defined and equals 2.

Q2. 1 mark · Multiple choice

Which of the following is the general solution (primitive) of $dy/dx = 2x$?
(A) $y = x^2 + C$
(B) $y = 2x + C$
(C) $y = x^2$
(D) $y = 2x^2 + C$

Answer

(A) $y = x^2 + C$ — the general solution contains an arbitrary constant.

Q3. 1.5 marks · Short answer

Determine the order of the differential equation $d^3y/dx^3 + 2d^2y/dx^2 + dy/dx = 0$ by identifying its highest-order derivative.

Answer

Highest-order derivative: d^3y/dx^3
∴ Order = 3

Q4. 2 marks · Short answer

Determine the degree of the differential equation $(d^2y/dx^2)^3 + (dy/dx)^2 = x$.

Answer

Highest-order derivative: d^2y/dx^2
Power of d^2y/dx^2: 3
∴ Degree = 3

Q5. 3 marks · Medium answer

For the differential equation $dy/dx = 2x$, find a solution function and write the corresponding curve. State the name given to the curve represented by a solution function.

Answer

The curve represented by a solution function $y = \phi(x)$ is called the solution curve (integral curve) of the differential equation.

On integrating,
$y = \int 2x\, dx$
$= x^2 + C$

$\therefore$ The solution function is $y = x^2 + C$, and its corresponding curve is the solution curve (integral curve) $y = x^2 + C$.

Q6. 4 marks · Long answer

Find the integrating factor of $dy/dx+(2x+1/x)y=x^2$, for $x>0$.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/differential-equations

Q7. 5 marks · Long answer

Verify that y = e^(−3x) satisfies $d^2y/dx^2 + 6dy/dx + 9y = 0$. Find the first and second derivatives, substitute them into the equation, and check that its two sides are equal.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/differential-equations

Q8. 6 marks · Very long answer

For each differential equation below, determine its order and degree, if defined. Show how the highest-order derivative and its power determine the degree, and indicate whether each equation is polynomial in its derivatives: (i) $(d^2y/dx^2)^2 + dy/dx = 0$; (ii) $\sin(dy/dx) + d^2y/dx^2 = 0$; (iii) $(d^3y/dx^3) + (d^2y/dx^2)^2 = 0$. State the possible kind of values of order and defined degree.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/differential-equations

Q9. 9 marks · Very long answer

Solve the homogeneous differential equation $dy/dx=1+y/x$ by using the substitution $y=vx$. Show the differentiation, separation of variables and integration, and express the general solution in terms of x and y.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/differential-equations

Q10. 0.5 marks · Very short answer

Find the degree of $(d^2y/dx^2)^4 + dy/dx = 0$.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-12/maths/differential-equations



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