

Math 432 HW 1.1 Solutions

Assigned: 1, 3, 4, 5, 7, 8, 9, 11, 12, 13, 15, and 16.

Selected for Grading: 3, 9, 16

Solutions:

1-12. Let me give these in tabular form.

Equation	ODE or PDE	Linear?	Order	Independent Variable(s)	Dependent Variable(s)
1. $5d^2x/dt^2 + 4dx/dt + 9x = 2 \cos 3t$	ODE	Yes	2	t	x
3. $dy/dx = y(2 - 3x)/[x(1 - 3y)]$	ODE	No	1	x	y
4. $\partial^2 u/\partial x^2 + \partial^2 u/\partial y^2 = 0$	PDE	N/A	2	x and y	u
5. $y[1 + (dy/dx)^2] = C$	ODE	No	1	x	y
7. $dp/dt = kp(P - p)$	ODE	No	1	t	p
8. $\sqrt{1 - y} \frac{d^2 y}{dx^2} + 2x \frac{dy}{dx} = 0$	ODE	No	2	x	y
9. $x \frac{d^2 y}{dx^2} + \frac{dy}{dx} + xy = 0$	ODE	Yes	2	x	y
11. $\frac{\partial N}{\partial t} = \frac{\partial^2 N}{\partial r^2} + \frac{1}{r} \frac{\partial N}{\partial r} + kN$	PDE	N/A	2	r and t	N
12. $d^2 y/dx^2 - 0.1(1 - y^2)dy/dx + 9y = 0$	ODE	No	2	x	y

13. $dp/dt = kp$ for some constant, k .

15. $dT/dt = k [M(t) - T(t)]$ for some constant, k .

16. $dA/dt = k A(t)^2$ for some constant, k .

Remark: In 13-16, you really should mention that k (or whatever symbol you used) is a constant. I didn't make that part of the score this time but I might in the future.