Ross' Book

Assignment 1

p36. prob 11 Solve $(2xy-3)dx+(x^2+4y)dy=0$, $y(1)=2$.

15 " $\frac{3-y}{x^2}dx+\left(\frac{y^2-2x}{xy^2}\right)dy=0$, $y(-1)=2$.

37 " 18(a) Find the constant A such that the equation is exact and solve it: $(Ax^2y+2y^2)dx+(x^3+4xy)dy=0$.

p37.#24 Show that $\frac{1}{x^2+y^2}$ is an integrating factor for the eq.

$$[y+x(x^2+y^2)^2]dx+[y(x^2+y^2)^2-x]dy=0$$

and solve it.

p46#6 Solve $(e^v+1)\cos u\,du+e^v(\sin u+1)dv=0$

#9 " $(2xy+3y^2)dx-(2xy+x^2)dy=0$

#11 " $(x\tan\frac{y}{x}+y)dx-x\,dy=0$

p47#22 Solve by 2 methods (exact and homogeneous equation) the equation $(x+2y)dx+(2x-y)dy=0$

p56#15 $\frac{dy}{dx}-\frac{y}{x}=-\frac{y^2}{x}$ #16 $x\frac{dy}{dx}+y=-2x^6y^4$.

#19 $x\frac{dy}{dx}-2y=2x^4$, $y(2)=8$ #24 $\frac{dx}{dt}-x=\sin 2t$, $x(0)=0$.

p59#40 Solve Riccati Eq:

$$\frac{dy}{dx}=-y^2+xy+1,$$ given one solution $f(x)=x$.

p60#19 Solve: $4xy\frac{dy}{dx}=y^2+1$, $y(2)=1$

p78#10 Find the orthogonal trajectories of $x^2-y^2=cx^3$ and sketch the curves.

#11 Find the orthogonal trajectories of the family of ellipses having center at $(0,0)$, a focus at $(c,0)$ and semimajor axis of length $2c$.

p80#3. A ball weighing $\frac{3}{4}$ lb is thrown vertically upward from a point 6 ft above the surface of the earth with an initial velocity of 20 ft/sec. As it rises it is acted upon by air resistance that is numerically equal to $\frac{1}{64}v$ (in pounds), where v is the velocity (in feet per second). How high will the ball rise?