American University of Beirut

Math 202 Quiz #1, October 23,2010

1.Solve The DE

$$\frac{dy}{dx}=\frac{y-x}{y+x}$$

2.Find an integrating factor and use it to solve the following IVP

(2y2+3x+6)dx + 2xydy =0 , y(1) =1

3.Solve the following IVP

$$x\frac{dy}{dx}+y = y2f(x)\ ,y(1)=1$$

$$f(x)=\begin{cases} \boldsymbol{x^2, 1 \le x \le \frac{3}{2}} \\ \boldsymbol{0, \frac{3}{2} < x < 2} \end{cases}$$

4.In this problem the indicated function y1(x) is a solution of the given differentail equation. Use reduction of order to find a second non-trivial solution y2(x),and then compute the Wornskain W(y1,y2)

$$xy''+y' = 0;\ y_1=\ln x$$

5.In this problem you may use the fact that the area of an ellipse of equation $\frac{u^2}{p^2}+\frac{v^2}{q^2}=1$**,**

is πpq**.**

Let S be the part of the ellipsoid $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$ **in the first quadrant .[The "curved traingular surface ABC in the figure]. Let D be the solid , in the first octant, bounded by S and the coordinate planes, x=0,y=0,and z=0.**

(a) What are the outward unit normals to the four faces OAB,OBC,OCA,and ABC of the solid D?

Use the vector field F=i+j+k and the divergence theorem to evalute the surface integral

$$\iint_S \frac{\frac{x}{a^2}+\frac{y}{b^2}+\frac{z}{c^2}}{\sqrt{(\frac{x}{a^2})^2+(\frac{y}{b^2})^2+(\frac{z}{c^2})^2}}\,d\sigma$$

(b) If *L* is the path made up of the arc AB,followed by the arc BC,followed by the arc CA,evalute the line integral $\int_l \ \boldsymbol{F.dr}$