MTH 2227 - Practice Test #4

Spring 2018

Pat Rossi Name _____

1. Compute $\frac{\partial}{\partial x}\left[\sin\left(x^2y\right)+x^3-5y^4\right]$

2. Given $f(x,y)=\sin(x-2y)$, show that $f_{xy}=f_{yx}$

3. Convert from Cylindrical to Rectangular Coordinates: $(r,\theta,z)=\left(6\sqrt{2},\frac{\pi}{4},8\right)$

4. Convert from Spherical to Rectangular Coordinates: $(\rho,\theta,\phi)=\left(8,\frac{\pi}{6},\frac{2\pi}{3}\right)$

5. Convert from Rectangular to Cylindrical and Spherical Coordinates: $(x,y,z)=\left(2,2\sqrt{3},3\right)$ (Do not attempt to convert ϕ into increments of π)

6. Find the relative maxes and mins of the function $f(x,y)=x^3-y^3-3xy+4$

7. Convert the following equations from Rectangular Coordinates to Cylindrical Coordinates

   (a) $x^2+y^2+z^2=4$

   (b) $3x+y-4z=12$

   (c) $y^2+z^2=9$

   (d) $6x=x^2+y^2$

   (e) $y=xz$

8. Convert the following equations from Rectangular Coordinates to Spherical Coordinates

   (a) $x^2+y^2+z^2=4$

   (b) $3x+y-4z=12$

   (c) $y^2+z^2=9$

   (d) $6x=x^2+y^2$

   (e) $y=xz$

9. Convert to Cylindrical Coordinates and Integrate: $\int_{-3}^{3}\int_{-\sqrt{9-x^2}}^{\sqrt{9-x^2}}\int_{0}^{3+\sqrt{9-x^2-y^2}}1\,dz\,dy\,dx=$

10. Convert to Spherical Coordinates and Integrate: $\int_{-3}^{3}\int_{-\sqrt{9-x^2}}^{\sqrt{9-x^2}}\int_{\sqrt{x^2+y^2}}^{\sqrt{9-x^2-y^2}}1\,dz\,dy\,dx=$