Tutorial Sheet #4- Answer Key

Ans. 1. $x^2+2y^2+1 = 10+2(x-1)+8(y-2)+(x-1)^2+2(y-2)^2$

Ans.2 $e^{xy} \approx e\left[1+(x-1)+(y-1)+\frac{1}{2!}\left[(x-1)^2+(y-1)^2+4(x-1)(y-1)\right]\right]$

Ans.3 Let $(x_0,y_0)=(1,1)$ and $h=0.1, k = -0.2$; (i) 0.7354 (ii) 0.7229

Ans.4 Error in volume= 1.6π cm³, Error in lateral surface=π cm².

Ans.5 Assume $f(x,y)=(x^2+2y^3)^{1/5}$; 2.012

Ans.6 Local minimum at $\left(3^{-1/3},3^{-1/3}\right)$

Ans.7 Minima at (6,0), min $f=108$; Maxima at (4,0), max $f=112$; (5,1) and (5,−1) are saddle points.

Ans.8 $V = \dfrac{8abc}{3\sqrt{3}}$

Ans.9 d=2 units

Ans.10 Minima at $\left(\dfrac{3}{13},\dfrac{4}{13},\dfrac{12}{13}\right)$ and minimum value 144.

Maxima at $\left(-\dfrac{3}{13},-\dfrac{4}{13},-\dfrac{12}{13}\right)$ and maximum value 169.

Ans.11 Dimensions of the box are 4cm, 4cm, 2cm.

Ans. 12 Extreme values on the ellipse are at the four points (2,1), (−2, 1), (2, −1), and (−2, −1). Extreme values are $xy = 2$ and $xy = -2$.