(9) $y = e^x \Longrightarrow \underset{\text{the curvature}}{\underset{\parallel}{\kappa(x)}} = \dfrac{e^x}{(1+e^{2x})^{3/2}} = \dfrac{1}{e^{2x}\left[\frac{1}{e^{2x}}+1\right]^{3/2}}$

* $K(x) \longrightarrow 0$ as $x \longrightarrow \infty$
* $K(x)$ becomes maximum at $x = -\frac{1}{2}\ln 2$, or $\left(y = \frac{1}{\sqrt{2}}\right)$

at the point $\left(-\frac{1}{2}\ln 2, \frac{1}{\sqrt{2}}\right)$

(11) $x(\theta, \alpha) = (b + a\cos\alpha)\cos\theta$, $\quad 0 \le \theta \le 2\pi$

$y(\theta, \alpha) = (b + a\cos\alpha)\sin\theta \quad 0 \le \alpha \le 2\pi$

$z(\theta, \alpha) = a\sin\alpha$

(14) $f(x,y,z) = z^2 + 9x^2$, $\quad g(x,y) = f(x,y,0) = 9x^2$.

(a) $\text{Domain}(f) = \mathbb{R}^3$

$\text{Range}(f) = [0, \infty)$.

(b) $L_{k>0}(f) = \{(x,y,z) \mid z^2 + 9x^2 = k > 0\}$

$= $ a cylinder about the y-axis

$L_0(f) = \{(0, y, 0)\} = $ y-axis

$L_{k<0}(f) = \phi$

(c) $L_{k>0}(g) = $ Two planes $\quad x = \mp \sqrt{k}/3$

$L_0(g) = $ zy-plane

$L_{k<0}(g) = \phi$