(1) (a) an ellipsoid, (b) a plane, (c) a circular cylinder with z-axis as axis

(d) a paraboloid, (e) a hyperboloid of one sheet with axis equal to the z axis

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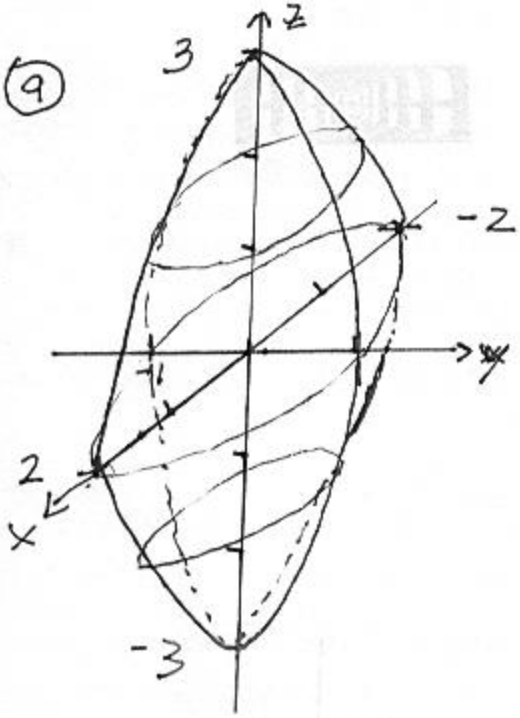
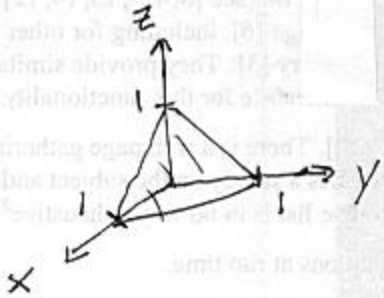
(2)

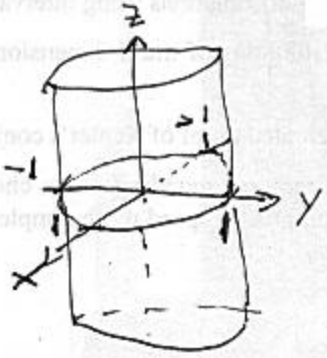
(a)



(b)



(c)



(3) The general form is

$z - z_0 = m(x - x_0) + n(y - y_0)$

$(x_0, y_0, z_0) = (0,0,1)$, $m = -1$, $n = -1$, so the equation is:

$z - 1 = -x - y$, i.e. $x + y + z = 1$, or $\boxed{z = 1 - x - y}$.

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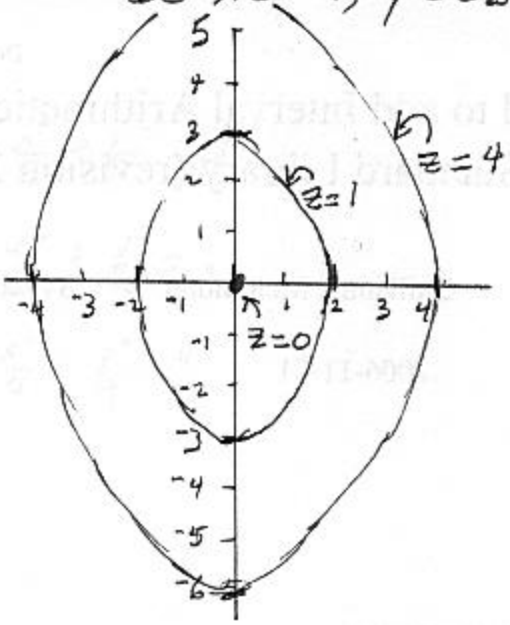
(4) $z = 0$: $\frac{x^2}{4} + \frac{y^2}{9} = 0$, the origin $(0,0)$

$z = 1$: $\frac{x^2}{4} + \frac{y^2}{9} = 1$, an ellipse intersecting the axes at $x = \pm 2$, $y = \pm 3$.

$z = 4$: $\frac{x^2}{4} + \frac{y^2}{9} = 4$, an ellipse intersecting the axes at $x = \pm 4$, $y = \pm 6$.



(5) The function is defined except on the diagonal line $y = -x$. Where f is defined

$f(x,y) = \frac{x^3 + y^3}{x + y} = x^2 - xy + y^2 \to 0$ as $(x,y) \to (0,0)$

Hence, $\lim_{(x,y)\to(0,0)} f(x,y) = 0$.