1) (a) $\sqrt{(3-2)^2 + (-3-1)^2 + (2-4)^2} = \sqrt{21}$

(b) $\left(\dfrac{3+2}{2}, \dfrac{-3+1}{2}, \dfrac{2+4}{2}\right) = (2.5, -1, 3)$

(c) Two possible parametrizations:

$(3, -3, 2) + t(-1, 4, 2)$ ie $x = 3-t, y = -3+4t, z = 2+2t$
At $t=0$, point is A. Point B is given by $t=1$.

$(3, -3, 2) + t(-.5, 2, 1)$ ie $x = 3-0.5t, y = -3+2t, z = 2+t$
At $t=0$, point is A. Point B is given by $t=2$

2) (a) To obtain graph of $z = \sqrt{x^2 + y^2} - 4$, reflect the graph of $z = -\sqrt{x^2+y^2}$ across xy-plane and shift down 4 units.

(b) To obtain graph of $z = (x-1)^2 + 2$, shift the graph of $z = x^2$ to the right along positive x-axis by 1 unit and shift up by 2 units.

3) (a) Sphere of radius 3 centered at $(1, -2, -5)$

(b) The elliptic paraboloid $y = x^2 + z^2$ reflected across xz-plane and moved up 3 units.

(c) Cylinder of radius 2 whose axis is the x-axis

(d) Plane parallel to yz-plane passing through $(5, 0, 0)$.

4) Solid cone between the planes $z = 0$ and $z = 2$.