(9.) $r(s,t) = \langle s\cos t, s\sin t, s \rangle$

$x = s\cos t \quad y = s\sin t \quad z = s$

$x = z\cos t \quad y = z\sin t$

$t = \cos^{-1}\left(\frac{x}{z}\right) \quad t = \sin^{-1}\left(\frac{y}{z}\right)$

$x = z\cos\left(\sin^{-1}\left(\frac{y}{z}\right)\right) \quad y = z\sin\left(\cos^{-1}\left(\frac{x}{z}\right)\right)$

$x^2 = s^2\cos^2 t \quad y^2 = s^2\cos^2 t \quad z^2 = s^2 = x^2 + y^2$

$z^2 = x^2 + y^2$: Surface of a circular cone with axis as z axis

(13.) $\boxed{\text{IV}}$ $r(u,v) = \langle u\cos v, u\sin v, v \rangle \quad x = u\cos v \quad y = u\sin v \quad z = v$

$r(k,v) = \langle k\cos v, k\sin v, v \rangle \quad x = k\cos v \quad y = k\sin v \quad z = v$

Graph has circular orbits with constant radius ~~k~~, follows a helix structure. Centered axis is z axis. Graph 4 has all of the preceding characteristics.

(17.) $\boxed{\text{III}}$ $x = \cos^3 u\cos^3 v \quad y = \sin^3 u\cos^3 v \quad z = \sin^3 v$

$v = k$

$x = \cos^3 u\cos^3 k \quad y = \sin^3 u\cos^3 k \quad z = \sin^3 k$

$a = \cos^3 k$

$x = a\cos^3 u \quad y = a\sin^3 u \quad z = \sin^3 k$

equation contains a diamond cross section parallel to the xy plane. graph III is the only graph with diamond/astroid cross section.