Name _____ Box _____

Worksheet #3 - Cylindrical and Spherical Coordinates

I Convert the coordinates of a point from one system to another system among the Cartesian, cylindrical, and spherical coordinate systems.

Cartesian	Cylindrical	Sphercial
$(2, 6, -3)$	_____	_____
_____	$(8, \pi/6, 1)$	_____
_____	_____	$(12, \pi/6, 2\pi/3)$

II Sketch the graphs of the equations

(A) $z = 3$

(B) $r = 7$

(C) $\rho = 7$

(D) $r^2 = z$

(E) $\theta = \pi/6$

(F) $\phi = \pi/3$

(G) $\rho = 5\sec(\phi)$

(H) $r = \sin(\theta)$

III Convert the equations from Cartesian coordinates to (a) Cylindrical coordinates (b) Spherical coordinates

(A) $x^2 + y^2 + z^2 = 25$

(B) $x^2 + y^2 = 25$

(C) $x^2 + y^2 + z^2 - 2z = 0$

IV Find inequalities that describe the solid and state the coordinate system used. Try to choose the coordinate systems so that the equations are as simple as possible.

(A) A cube with edges 7 meters long.

(B) A cylindrical shell 8 feet long with an inside diameter of 1.23 feet and an outside diameter of 3.14 feet.

(C) A spherical shell with inside radius of 2 meters and outside radius of 2.5 meters.

(D) The solid that remains after a hole 1 foot in diameter is drilled through the center of a sphere 8 feet in diameter.

Extra Credit The doughnut with outer radius 3 inches and inner radius 1.2 inches.