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function [point_data X Y Z] = generate_sphere(num_points, radius, origin)
%=====
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%GENERATES A STATISTICAL SPHERE IN 3-SPACE
%=====
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counter = 1;

%assumes the origin is a 3-vector-----
origin_x = origin(1);
origin_y = origin(2);
origin_z = origin(3);

%generates random points for each dimensions
X = origin_x + radius - 2*radius*rand(num_points,1);
Y = origin_y + radius - 2*radius*rand(num_points,1);
Z = origin_z + radius - 2*radius*rand(num_points,1);

point_data = [X Y Z];

%finds and removes points beyond the radius
temp_matrix = point_data .- origin;
temp_norms = sum((temp_matrix).^2,2);
temp_indexes = find(temp_norms > radius^2);

point_data(temp_indexes,:) = [];
X(temp_indexes) = [];
Y(temp_indexes) = [];
Z(temp_indexes) = [];

endfunction

```