1.1 triangles = n * n * 2.

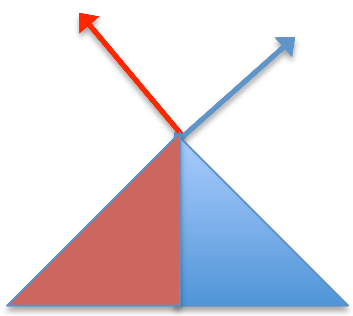
1.2 (1,0,0)

2.1 I would use y = 0, x = 0.5 cos (theta), = 0.5 * sin(theta). To calculate what theta I'm using, I would divide the radians in a circle, 2pi, by the number of edges I want, n. For every edge, I would increment theta by 2pi/n. So, theta = 2pi * i, where i increments from 0 to N. It represents the angle on the XY plane.

2.2a) <sqrt(2)/2,0,-sqrt(2)/2>
b) <cos(theta),0,sin(theta)>

3.1 When p1 is 1, there are 2 triangles. When p1 is 3, there are 5 triangles. When p1 is 5, there are 9 triangles. When p1 is n, there are n * 2 – 1 triangles.

3.2



3.3 (y2-y1)/(x2-x1) = (-1/2 – ½) / (1/2-0) = m = **-2**

3.4 The perpendicular line has slope 0.5, and can be defined then by the vector <2,1>. The normalized vertical component is then **1/sqrt(5)**

3.5 **2/sqrt(5)**

4.1 The normal of a sphere are composed of "lines" that go from the center to the surface of the sphere. If the sphere is centered at (0,0,0), then <x,y,z>, the Cartesian coordinates, are also the line orthogonal to the surface. So, we have
x= 0.5 sin (pi/2) cos (pi/4) = sqrt(2)/4
y = 0.5 cos (pi/2) = 0
z = 0.5 sin(pi/2) sin (pi/4) = sqrt(2)/4
We divide by the magnitude, which is ½.

<sqrt(2)/2,0,sqrt(2)/2>

5. We should use composition if we use a function for all shapes, and inheritance if we use a function for only some shapes.