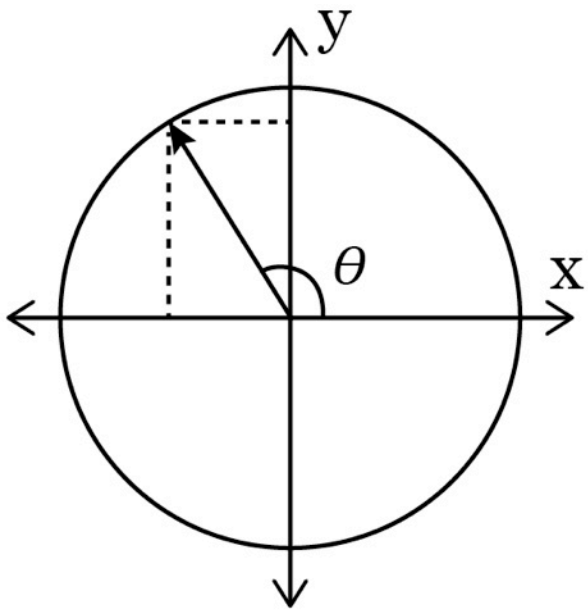
CS148: Reading Guide, Tuesday 1 July

Shirley Ch. 2 pp. 13-29, Ch. 4: Ray Tracing

You'll be needing your basic trig and linear algebra for the second assignment. You should find this reading extremely helpful! The chapter on ray tracing provides a foundation for understanding what you'll be asked to do in HW2, along with many useful derivations.



The figure at left shows the unit circle in the x,y plane. A vector lies on the unit circle at an angle θ to the x-axis as shown.

1) What is the value of the vector projected onto the x-axis? y-axis? (see dashed lines.)

x-axis: cosΘ

y-axis: sinΘ

2) Prove the Pythagorean identity, $\sin^2(\theta) + \cos^2(\theta) = 1$.
(Feel free to continue on the back of this sheet.)

3) If you took the dot product of the given vector with $(1, 0)^T$, would the sign be positive or negative? (Visualize projecting the vector onto the x-axis.)

Negative

4) What kind of material might you visualize with Lambertian shading? Blinn/Phong shading?

Lambertian: Rough cloth surface

Blinn/Phong: Polished marble floor