Mathematics/Science 381H – Ancient and classical mathematics
Trent University, Fall 2007
Assignment #6
Due on Friday, 7 December, 2007.

Another angle?

1. The classic problem of trisecting an arbitrary angle using an unmarked straightedge and compass turns out to be impossible to solve. However, various other methods for trisecting arbitrary angles were found by ancient Greek and Hellenistic mathematicians. Find and describe three such methods, and give a detailed explanation of why it works for one of them. *[10]*

The Physicist's Lament
or
It All Started With Wave-Particle Duality

Extremely tiny billiard balls
Create a force on every wall,
Moving much too fast to fall:
I've looked at light that way.
But now this doesn't seem to fit,
When looking through a double slit.
And shadows blur a little bit
With this peculiar ray.

I've looked at light from both sides now,
From speck and wave, and still somehow,
It's light's illusions I recall.
I really don't know light at all.

Moving steady as can be,
With lots of simultanity.
A smooth increase in entropy:
I've looked at time that way.
But near the speed of light, I've found,
All rates of change start slowing down,
While antimatter turns things round,
And goes the other way.

I've looked at time from both sides now,
From where and when, and still somehow,
It's just equations I recall.
I really don't know time at all.

Yellow, red, and sometimes blue,
Just u's and d's will nicely do
To give protons, and neutrons, too:
I've looked at quarks that way.
But lambdas now are acting strange.
They're taking much too long to change.
For something's lost if something's gained,
During their strong decay.

I've looked at quarks from both sides now,
From up and down, and still somehow,
It's only hadrons I recall.
I really don't know quarks at all.

Words by William Hughes; intended to be sung to the tune of Both Sides Now*, by Joni Mitchell.*