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##paraboloid generation using plane sheets
##initialize octave
##This script finds and plots dimensions of a sector to assemble a
##full paraboloid.

#initialize octave
clc()
clear all;
format bank;
focus=input("How deep the mirror should be?: ")# ask for focus
sectors=input("How many sectors the mirror must have?: ")#ask for number
#of sectors
rings=input("How many rings will make the mirror?: ")# ask for number of
# rings

x=linspace(0,2*focus,rings);
larc=(0.5/focus)*cumtrapz(x,sqrt(4*focus^2+x.*x));#lengths of arcs @ every
#value of x
halfwidth=pi*x/sectors;#useful to plot the sector drawing
fullwidth=2*pi*x/sectors;#useful to view the numbers for hand drawing.
disp"Press enter to see the detailed dimensions of one sector"
pause;
SectorLength__Fullwidth=[larc',fullwidth']
disp"Press enter to see the drawing of one of (sectors)sector."
pause;
##plot the sector now
#plot the top flat of sector
plot([0,0],[0,larc(end)],"linewidth",2,"color","red");hold on;
#plot right side of sector
plot([halfwidth],[larc],"linewidth",3);hold on;
#plot left side of sector
plot([-halfwidth],[larc],"linewidth",3);hold on;
plot([-halfwidth(end),halfwidth(end)],[larc(end),larc(end)],"linewidth",3);hold
on
xlabel("Width of the sector");
ylabel("Ring Boundary");
title("Sector Shape");
#legend("sector_shape")
set(gca, "ytick", larc);hold on;grid minor;
set(gca, "xtick", [-halfwidth,halfwidth]);hold on;grid minor;

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