Chapter 7 Worksheet E

Objectives: review check-within, max/min/real->int, learn to use a computer algebra system to solve for an equation. Get exposed to radial gradients.

1. Use a computer to find a formula for the linear function red(x): when x=0, red=175; when x=225, red=75. Define a function red using the formula, and make two checks.
2. Make a "v2" of your function above that always gives answers between 80 and 160. Modify your tests to demonstrate this property.
3. **Beware**. Use a computer to find a formula for the linear function green(y): when y=0, green=10; when y=200, green=250.
4. The number 355/113 is supposed to be close to pi.
    a. Write a *good-area* function that takes in a number(radius) and produces the area of a circle with that radius, using 355/113 instead of pi.
    b. Write checks showing that (good-area 10) and (good-area 100) are within 0.2 of the true answer.
    c. Write a bad-area function using 355/223 instead of pi.
    d. Show that (bad-area 10) and (bad-area 100) fail the same tests that good-area passes. You can comment them out after you verify that they fail. (Warning: a lot of people make mistakes that cause bad-area to **pass!** Don't miss this chance to learn.)
5. Create a 600x150 rectangle that starts full red on the left and has no red on the right.



6. Add to your answer so that the amount of green goes from 75 on the left to 125 on the right. Make new functions, so you still have the old ones.



7. Create a 510x510 image that starts black in the middle and then fades to white at the edges. [Not to size.]



8. EXTRA CHALLENGE. You may know build-image. The function build-image/extra is a variation that lets you pass the model to your color function. Make an animation so that the color at pixel (x,y) is (x-d, d, y-d), where d is the distance of the mouse from the origin.



Mouse near upper left



Mouse near lower right

9. PREVIOUS YEAR PROJECT. DO NOT ATTEMPT WITHOUT A PLAN. Write an animation that brightens everything within 10 pixels of your mouse using the build-image/extra function.