

- 1.) Given: the illumination on a horizontal plane outside a room is 1200 lumen/ft² (fc), and the DF for the rear corner of the room is 2%:
 - a.) is the DF enough (under the guidelines) for a drafting station?
 - b.) what would be the actual footcandle level at that spot at that time?
- 2.) If you wanted to provide enough light for a 40,000 ft² warehouse using overhead horizontal skylights, how many skylights of what size would you need?
- 3.) If you wanted to provide enough light for an office space that was 40 ft x 40 ft and 8 ft high, lit entirely from one side, how big would the window have to be? (Show your assumptions and your work.)
- 4.) Now assume that the above room is approximately 20 ft. deep x 40 ft. long x 10 ft high. It is on the South facade of the building, and will have a continuous window strip, because that is what you wish to express in the facade (who knows why).

Design and draw a good cross section (taken at the window) for that facade, to limit thermal overheating but provide natural illumination. (You may use any aesthetic you want, but add enough notes to the cross section to explain it. You do not need to do any calculations, yet.)

- 5.) Assume that the above room had a simple facade with no overhangs, no setbacks, etc (unlike how you designed it, of course). The bottom of the window (the sill) is at 2.5 ft. and the top of the window (the head) is at 10 ft. You may assume whatever glass transmission, ground, wall and ceiling reflectances you like. What is the illumination on the work plane in the middle of the room at noon on a sunny September day? (The solar altitude angle is 56° , you must determine the azimuth.)
- 6.) Discuss the difference that it would make to your calculation if the room were on the 40th story of a downtown office building. You may assume whatever ground conditions you like.
- 7.) Using the rule of thumb for offices, what would be the maximum depth for that room if it were an office?