Remote Sensing with Environmental Satellites
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Quiz 1
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Name:_____

1.   True / False

T   1.   If blackbody A has a higher temperature than blackbody B,
            blackbody A will emit more radiance at all wavelengths than
            blackbody B.

F   2.   The location of maxima of the Planck function per wavelength
            $B(\lambda_{max}, T)$ and the Planck function per wavenumber $B(\nu_{max}, T)$
            are related by $\lambda_{max} = 1/\nu_{max}$.

T   3.   Solar radiance is the same regardless of how far from the sun
            you are.

F   4.   For temperatures between 200 and 300 K, the Planck radiance
            at 10 microns is always greater than the Planck radiance at 15
            microns.

            Wiens Law says Planck max at 200 K is at 15 microns

T   5.   A blackbody at 300K emits roughly five times the
            energy/time/area than a blackbody at 200K.

            Stephens Law says energy/time/area goes as T^4

2. If the albedo (cloudiness) of the earth increases from 33% to 50%, what is the corresponding change in the earth effective temperature (from 255 K to what)? Remember that effective temperature is the blackbody temperature at which solar energy received is equal to infrared energy released. Use Stefan's law (irradiance is proportional to T^4) to help you derive your answer.

$(1-A) S / 4 = \sigma T^4$

So

$255^4 / (1 - 0.33) = T^4 / (1 - 0.50)$

$T=237$