PHYS 301 Doppler Effect for Light Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If a source emitting light waves of frequency *f*0 moves directly away from a detector with relative radial speed *v* (and speed parameter *β* = *v*/*c*), the frequency *f* measured by the detector is:  
 http://edugen.wiley.com/edugen/courses/crs4957/halliday9118/halliday9088c37/math/math059.gif

Show that, for speeds much less than *c*, the above equation becomes,

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| http://edugen.wiley.com/edugen/courses/crs4957/common/art/pixel.gif | |
| http://edugen.wiley.com/edugen/courses/crs4957/halliday9118/halliday9088c37/math/math060.gif |  |
| http://edugen.wiley.com/edugen/courses/crs4957/common/art/pixel.gif | |

where *Δλ* (= *λ* - *λ*0) is the *Doppler shift* in wavelength due to the motion.