Physics 267: Problem #10

A laser beam is emitted from the surface of the moon, $\lambda = 550$ nm. Find the wavelength of light that would be detected at the earth's surface. First, assume that the moon is at rest with respect to the earth. Would anything be different if we took into account the moon's orbital velocity? Make clear any assumptions.

$m_{earth} = 6 \times 10^{24}$ kg
$r_{earth} = 6400$ km
$m_{moon} = 7.4 \times 10^{22}$ kg
$r_{moon} = 1700$ km
$r_{orbit} = 400,000$ km
$G = 6.7 \times 10^{-11}$ m^3 kg^{-1} s^{-2}