Waves on a string solutions

λn = 2L/n v = fλ v2 = T/μ

1. λ3 = 1.10/3 = 0.37 m λ5= 1.10/5 = 0.22 m λ6 = 1.10/6 = 0.18 m
2. λ1 = 1.10 m v = 297 m/s so f1 = 297/1.10 = 270 Hz
3. v = fλ = 120Hz(0.60 m) = 72 m/s (72 m/s)2 = T/(0.00145/5) = 1.50 N
4. v = (T/μ)1/2 = (88.2/(0.00050/0.50))1/2 = 297 m/s 297 m/s/1.0 m = 297 Hz = f1 (λ1 = 2(0.5) = 1.0 m f2 = 297(2) = 594 Hz, f3 = 891 Hz 4th overtone is f5= 1485 Hz
5. 120(0.31) = 37.2 m/s (37.2 m/s)2 = 1.2/x/(0.50m) x = 0.0810 kg (81 g)
6. f3 = 165 so f1 = = 55 Hz f4 = 4 (f1) = 220 Hz
7. v = fλ v = 200Hz)(1.20 m) = 240 m/s 2402 = T/(0.003/.6) T = 288 N
8. v = 196(0.32) = 62.7 m/s2 = T/(0.00055)/0.32 m)= 6.75 N
9. The 330 Hz wave: L = 0.70 m so λ1 = 1.4 m. v = fλ and v = 235.7 m/s

This will be the same speed for all waves on that string.

440 Hz wave: 235.7/440 Hz = λ = 0.536 m = 0.54 m. The 1st harmonic of this must have a string length of half that or 0.27 m. You must place your finger 0.43 m from the top end of the string.