Free Fall Practice Problems from 2.4

On a separate sheet of paper, show your work. List your knowns (suvat), show which formula you are going to use, and show the knowns in that formula. Round to the correct significant figures, ignore air friction and use the convention that down is negative. g = 9.81 m/s/s

49.0 m 31.0 m/s 32.4 m	1. A Turkey is shot straight up and remains in the air for a total (up <u>and</u> down) time of 6.32 s before coming down again to the same elevation. What is the greatest height it reaches? What was its initial velocity? What is its displacement exactly 5.00 seconds after it is launched?
19.2 m 1.98 s 3.65 s	2. A frozen pot pie is launched upwards at 19.4 m/s, and lands at the same elevation from which it was launched. To what height does it rise before going back down again? What time does it take to reach the very highest point? What time elapses between release, and the pie being 5.50 m above the release point on the way down?
-9.66 m/s 31.7 m	3. A lemon is launched upwards at 28.0 m/s. It goes up, and on the way down it strikes the top of a 35.2 m tall light tower. With what velocity does it strike the light tower? What is its displacement 4.15 seconds after it is launched?
25.6 m/s 33.4 m -17.9 m/s	4. A flaming digital air rocket is launched vertically upwards, and is in the air for a <u>total</u> (up <u>and</u> down) of 5.22 s, before striking the ground again. At what velocity was it launched? What height did it reach? What was its velocity at an elevation 17.0 m as it was going <u>down</u>?
11.2 m/s 2.29 s 1.01 m	5. A chicken nugget is thrown upwards and reaches a height of 6.45 m above its release point, and is caught at the same elevation from which it was thrown. What was its initial velocity? What total time is the nugget in the air? What is its position 2.20 seconds after it is released?
-15.9 m/s 1.20 s	6. A gourd is thrown downward from the top of a 12.0 m tall building at a velocity of -4.12 m/s. With what velocity will it strike the ground? What time will it take to reach the ground?
42.0 m/s 84.6 m 7.30 s	7. A watermelon is launched straight upwards, and strikes the ground at the same elevation from which it is launched. It goes to a maximum height of 89.7 m before coming down. What was its initial velocity leaving the ground? What is its displacement 5.30 s after it leaves the ground? What time will it take from when it is launched to when it reaches an elevation of 45.0 m on the way down?
11.7 m/s -21.8 m/s	8. A projectile is thrown vertically upward from the top of a 17.2 m tall building and strikes the ground 3.42 s after it is released. What was its initial velocity? With what velocity does it strike the ground?
14.7m 2.86 s	9. A hot pocket is thrown vertically upwards at 17.0 m/s, and lands on a roof on the way down that is 8.50 m tall. What height does it reach? What time does it take to hit the roof on the way down?
13.5 m/s -7.82 m/s	10. A giant sloth throws a ball upward from the ground, and it comes down on top of a 6.12 m tall building in 2.17 s What is the ball's initial upward velocity? With what velocity does it strike the roof?