**Physics**

**Free Fall Practice Problems for A2.4**

Ignore air friction and use the convention that down is negative. g = 9.8 m/s/s

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| 52.2 m  14.2 m/s  3.27 s | 1. A giant lizard is shot into the air straight upwards at 32.0 m/s. What is the greatest height it reaches? What is its velocity when it reaches a height of 42.0 m on the way up? What time will it take to reach its highest point? |
| 85.6 m  85.8 m  8.37 s | 2. A baseball is popped up at 41.0 m/s and is caught at the same elevation from which it was hit. What is its displacement 4.00 s after it is hit? How high does it go? What total time does it spend in the air? (up and down) |
| 21.3 m/s  23.1 m | 3. A lemon is shot in the air and lands at the same elevation from which it was launched 4.34 s later. What was its initial velocity, and to what height did it go before coming back down? |
| 1.35 s  -10.8 m/s  -13.2 m/s | 4. A person falls from rest into water 8.92 m below her. What time will it take her to reach the water? What is her velocity at 1.10 s? What is her velocity of impact with the water? |
| 2.09 s  -20.5 m/s | 5. A giant lizard falls off of a 21.5 m tall cliff. What time does it take to reach the ground? What is its velocity of impact? |
| 51.9 m/s  138 m | 6. A potato is fired from a potato cannon straight up and returns to the same elevation from which it was launched 10.6 s later. What was its initial velocity, and to what height did it go? |
| -15.9 m/s  1.86 s | 7. Roy G Biv falls off a 17.0 m tall cliff into water. What is his velocity 1.62 s after he falls? What time will he take to reach the water? |
| -6.37 m  -14.7 m  2.25 s | 8. A drop package in a drop tower falls 24.8 m. What is its displacement at 1.14 s? What is its displacement when it reaches a velocity of -17.0 m/s? What time does it take to reach the bottom of the drop tower? |
| -8.46 m/s  26.8 m  4.67 s | 9. An air rocket is launched straight upwards at 22.9 m/s and lands at the same height from which it is launched. What is its velocity at a time of 3.20 s? What is the greatest height it reaches? What is its total time in the air? |
| -0.992 m  0.606 s | 10. An egg falls from a 1.80 m tall shelf. What is its displacement 0.450 s after it leaves the shelf? What time does it take to reach the floor? |