Conservation of Energy Questions from A6.2

0.992 m 62.6 N 13.7 m/s 7.04 m/s	1. a. A 26.0 N/m spring is stretched 0.650 m. If it is given 7.30 J more potential energy, how much has it been stretched? b. A baseball pitcher speeds a 0.145 kg ball from rest to 39.2 m/s over a distance of 1.78 m. What must be the average force exerted on the ball? (Neglect friction or any change in elevation) c. A 1350 kg car is moving at some speed at an elevation of 4.62 m partway up a hill, and then coasts to a stop at an elevation of 14.2 m. How fast was it going at 4.62 m elevation? (Neglect friction) d. A 125 kg sled is going 3.31 m/s at the top of a 2.65 m tall hill. At the bottom it hits a patch of dirt that exerts a slowing force of 137.2 N for 6.12 m. How fast is the sled going after the dirt patch? (Neglect friction)
14.1 m/s 8.88 m 64.2 N 2.19 m	2. a. A 0.570 kg hammer is going 9.80 m/s. How fast is it going if it is given 29.0 more J of kinetic energy? b. A 1540 kg car starts at rest and rolls down a hill. At the bottom it is going 13.2 m/s. How high was the hill? (Neglect friction) c. Mom gives 48.0 kg Tamara a push from rest on her massless sled for a distance of 7.60 m at the top of a 3.40 m tall hill. If she is going 9.33 m/s at the bottom of the hill, what force did Mom exert at the top to speed her up? (Neglect friction) d. A 421 kg rollercoaster car going 3.54 m/s hits an accelerator that exerts a force of 718 N to speed up the car over a distance of 14.9 m. The car then rolls up a hill where it is going 4.52 m/s. What is the height of the hill? (Neglect friction)
9.62 J 5.39 m 6.08 m/s 5.80 m	3. a. A 37.0 N/m spring is compressed 1.40 m. How much energy is released if it is allowed to expand so that it is compressed only 1.20 m? b. A 0.145 kg ball compresses a massless spring with a constant of 38.0 N/m a vertical distance of 0.635 m, and is then released so that it shoots straight up. To what maximum height does the ball rise above its lowest position with the spring compressed? (Neglect friction) c. A 0.145 kg ball compresses a massless spring with a constant of 38.0 N/m a vertical distance of 0.635 m, and is then released so that it shoots straight up. What is the velocity of the ball when it has risen a distance of 3.50 m above its lowest point? (Neglect friction) d. A 748 kg rollercoaster car is going 8.50 m/s at the top of a 3.15 m tall hill. At what height is it when it is going 4.50 m/s? (Neglect friction)
13.8 m 18.9 m/s 7.69 m/s 7.05 m	4. a. A 5.60 kg mass is 3.80 m above the ground. What is its height after it has gained 550. J more of potential energy? b. A 0.145 kg baseball is popped straight up, and goes 18.3 m in the air before coming back down. What was its initial velocity? (Neglect friction) c. A 1725 kg car going 13.7 m/s on a level road strikes a 1540 N/m spring that slows it down. What is the velocity of the car when it has compressed the spring 12.0 m? (Neglect friction) d. A 657 kg Rollercoaster car at rest on top of a 4.63 m tall hill is sped up by a force of 7480 N for a distance of 4.50 m. What is the height of the car when it is going 7.42 m/s (Neglect friction)
1.50 J 0.273 m 0.661 m 9.71 m/s	5. a. A 0.145 kg baseball speeds up from 6.70 m/s to 8.10 m/s. What is the change in kinetic energy? b. Ferdinand exerts a force of 153.3 N for a distance of 21.5 m on the level speeding up a 1230 kg car initially at rest. The car then rolls up an incline. How much elevation will the car gain before it stops? (Neglect friction) c. Reginald exerts a force of 179.5 N for a distance of 55.0 m on the level speeding up a 1027 kg car from rest. The car then rolls up an incline. What elevation has the car gained when it has a velocity of 2.50 m/s? (Neglect friction) d. A 415 kg roller coaster car initially at rest is launched from the top of a 4.31 m tall hill by a 1890 N/m spring compressed a distance of 5.75 m. What is the speed of the car when it is at the top of a 7.18 m tall hill? (Neglect friction)