Easy:

1. An airplane is in level flight at 500 ft/sec at 7071 feet elevation. As it is directly overhead, a guerrilla group tries to shoot it down by firing a rocket that travels in a straight line with an acceleration of 100feet/sec2 .At what angle from the horizontal should the rocket be fired for a direct hit on the plane? The rocket starts from rest.
2. . 90° B).60° C). 45° D).30° E).it will never hit the plane

C

1. Jane, mass 50 kg, stands on a cliff 30 m above the level jungle floor. She holds one end of a 20 m ideal vine horizontally stretched to a strong branch as shown. Tarzan, mass 100kg, appears on the jungle floor directly below the branch.Jane drops from the cliff, swings down through 90°, and lets go. Tarzan realizes her error and runs with constant acceleration to catch her, starting when she lets go of the vine. Just as they reach each other, the jungle floor suddenly becomes frictionless. Assuming Tarzan clutches Jane, or vice-versa, calculate their horizontal speed as they slide along the slippery jungle floor towards a hungry crocodile.
2. . 20 m/s B). 33m/s C). 24m/s D). 41m/s E). 15m/s

b

1. In the preceding question, what is the minimum breaking strength the ideal vine must have to survive the action described?
2. . 0N B). 1000N C). 2000N D). 1500N E). 500N

Medium:

4. Humpty Dumpty (a hard-boiled egg) fell from a wall and landed on a short light coil spring resting vertically on the pavement below. The spring compressed and expanded uniformly, throwing the undistorted egg back up through a distance. How high did the spring fly into the air? (The spring is not fastened to the pavement.)

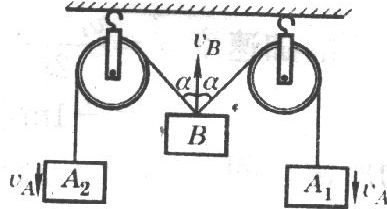
1. . 0m B).3m C). 6m D).9m E).12m

b

1. We owe our lives to the energy reaching us from the sun. At a particular planet, the solar energy flux E(the amount of energy from the sun arriving per square meter per second) depends on the distance from the sun to the planet. If T is the period of that planed in its journey around the sun, calculate how E depends on T. The letter K stands for a constant.
2. . E = KT2  B). E = KT-2 C). E = KT D). KT-3/2 E). E = KT -4/3

e

1. We know Va and ɑ， try to find Vb.



7. In Fig. a uniform, upward electric field of magnitude

2.00×103 N/C has been set up between two horizontal plates by charging the lower plate positively and the upper plate negatively. The plates have length L=10.0 cm and separation d=2.00 cm. An electron is then shot between the plates from the left edge of the lower plate.The initial velocity of the electron makes an angleθ=45.0° with the lower plate and has a magnitude of 6.00 × 106 m/s. (a) Will the electron strike one of the plates? (b) If so, which plate and how far horizontally from the left edge will the electron strike?



8.A clock face has negative point charges －q, －2q, －3q, . . . , －12q fixed at the positions of the corresponding numerals.The clock hands do not perturb the net field due to the point charges. At what time does the hour hand point in the same direction as the electric field vector at the center of the dial? (Hint: Use symmetry.)