W1.08D

Vertical Projectiles [D] KEY

A ball is shot upward from the top of a 46.5 m cliff with an initial velocity of 23.2 m/s. After reaching its peak, the ball falls such that it just misses the edge of the cliff and lands at the base of the cliff. ("Up" is positive)

1. How much time does it take the ball to reach its peak? **2.32 sec .**

2. How high above the base of the cliff is this peak? **73.41 m .**

   [26.91 m + 46.5 m]

3. What is the ball's velocity 6 seconds after it is shot? **-36.8 m/s .**

4. What is the ball's acceleration 2.5 seconds after it is shot? **-10 m/s² .**

5. What is the ball's velocity just as it passes the edge of the cliff on the way down? **-23.2 m/s .**

6. What is the ball's maximum positive velocity? **+23.2m/s .**

7. What is the ball's maximum negative velocity? [same as #13] **-38.3 m/s .**

8. What is the ball's displacement 6 seconds into the flight? **-40.8 m .**

   [?s=v(t) so -6.8 m/s x 6 s]

9. What is the ball's velocity at the peak? **0 m/s .**

10. What is the ball's acceleration at the peak? **-10 m/s² .**

11. What is the ball's displacement for the entire flight? **-46.5 m .**

12. What distance did the ball travel for the entire flight? **100.32 m .**

    [26.91 m + 26.91 m + 46.5 m]

13. What is the ball's velocity the instant before hitting the ground? **-38.3 m/s .**

    [$(v_f)^2 = (v_0)^2 + 2a?s$ so $v_f = \pm 38.3$ m/s]