**P3.2 Cliff Practice Problems**

Round to three figures, Ignore air friction and use the convention that down is negative. g = 9.80 m/s/s

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| 1.25 s  9.07 m/s  -12.2 m/s  15.2 m/s, 53.4o blw hrz | 1. A ball is projected with a purely horizontal velocity from an 7.60 m tall cliff and lands 11.3 m from the base of the cliff.  a. What time is the ball in the air?  b. With what purely horizontal velocity was it projected from the top of the cliff?  c. What is the final vertical velocity? (Just before it hits the ground)  d. Draw a picture of the final velocity of impact. Calculate the speed it is traveling, and find the angle below horizontal the velocity makes. |
| 19.6 m  2.00 s  -19.6 m/s  23.2 m/s, 57.5o blw hrz | 2. A ball leaves the edge of a cliff with a purely horizontal velocity of 12.5 m/s, and lands 25.0 m from the base of the cliff  a. How high is the cliff?  b. What time does it take the ball to hit the ground?  c. What is the final vertical velocity? (Just before it hits the ground)  d. Draw a picture of the final velocity of impact. Calculate the speed it is traveling, and find the angle below horizontal the velocity makes. |
| 9.88 m high  12.9 m  -13.9 m/s  16.6 m/s, 56.8o blw hrz | 3. A ball rolls off the edge of a cliff. The instant it leaves the edge, it has a purely horizontal velocity of 9.10 m/s, and it strikes the ground after 1.42 seconds.  a. How high is the cliff?  b. How far from the base of the cliff does the ball land?  c. What is the final vertical velocity? (Just before it hits the ground)  d. Draw a picture of the final velocity of impact. Calculate the speed it is traveling, and find the angle below horizontal the velocity makes. |
| 1.41 s  19.0 m  -13.8 m/s  19.3 m/s, 45.6o blw hrz | 4. A ball is projected sideways at 13.5 m/s from the top of a 9.70 m tall cliff.  a. What time is the ball in the air?  b. How far from the base of the cliff does the ball land?  c. What is the final vertical velocity? (Just before it hits the ground)  d. Draw a picture of the final velocity of impact. Calculate the speed it is traveling, and find the angle below horizontal the velocity makes. |
| 20.6 m high  10.5 m/s  -20.1 m/s  22.7 m/s, 62.3o blw hrz | 5. A ball rolls off the edge of a cliff with a purely horizontal velocity, and strikes the ground 2.05 s later at a distance of 21.6 m from the base of the cliff.  a. How high is the cliff?  b. What was the ball’s horizontal velocity?  c. What is the final vertical velocity? (Just before it hits the ground)  d. Draw a picture of the final velocity of impact. Calculate the speed it is traveling, and find the angle below horizontal the velocity makes. |