**3.2 Cliff Problem Quizlette (turn this in) Name**

**1. Red Elk runs at a speed of 9.20 m/s horizontally off a cliff that is 6.40 m above the water.**

A) Set up your horizontal/vertical table, fill it with known quantities, and solve for everything you don’t know. (You know horizontally: both velocities and the acceleration, and vertically: the displacement, the initial velocity, and the acceleration)

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| --- | --- |
| H | V |
| x  vi  vf  a  t | x  vi  vf  a  t |

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| --- | --- | --- |
| B) What time is he in the air?  (1.14 s) | C) What is his final vertical velocity of impact? (Just before he hits the water) (-11.2 m/s) | D) How far from the base of the cliff does he hit the water?  (10.5 m) |
| E) Draw a picture of his final velocity of impact. Calculate the speed he is traveling, and find the angle below horizontal his velocity makes. (14.5 m/s, 50.6o below horiz.) | | F) What is his speed of impact with the water? (14.5 m/s) |

**2. Red Elk runs with a purely horizontal velocity and lands 8.50 m from the base of the cliff 1.20 seconds later.**

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| a. How high is the cliff? | b. What was his horizontal velocity? | c. What is his final vertical velocity? |

d. Draw a picture of his final velocity of impact. Calculate the speed he is traveling, and find the angle below horizontal his velocity makes.

a) 7.06 m, b) 7.08 m/s, c) -11.76 m/s, d) 13.7 m/s at 58.9o below horiz.

**3. Red Elk runs with a purely horizontal velocity of 5.60 m/s and hits the water 1.80 seconds later.**

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| a. How high is the cliff? | b. How far from the base of the cliff does he land? | c. What is his final vertical velocity? |

d. Draw a picture of his final velocity of impact. Calculate the speed he is traveling, and find the angle below horizontal his velocity makes.

a) 15.9 m, b) 10.1 m, c) -17.64 m/s, d) 18.5 m/s at 72.4o below horiz.

**4. Red Elk runs with a purely horizontal velocity of 4.30 m/s and lands 5.10 m from the base of the cliff .**

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| a. What time was he in the air? | b. How high is the cliff? | c. What is his final vertical velocity? |

d. Draw a picture of his final velocity of impact. Calculate the speed he is traveling, and find the angle below horizontal his velocity makes.

a) 1.186 s, b) 6.89 m, c) -11.6 m/s, d) 12.4 m/s at 69.7o below horiz.

**5. Red Elk runs with a purely horizontal velocity and lands 8.60 m from the base of a 13.0 m tall cliff.**

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| a. What time is he in the air? | b. What is his horizontal velocity? | c. What is his final vertical velocity? |

d. Draw a picture of his final velocity of impact. Calculate the speed he is traveling, and find the angle below horizontal his velocity makes.

a) 1.629 s, b) 5.280 m/s, c) -15.962 m/s, d) 16.8 m/s at 71.7o below horiz.