2.4 Quizlette – Free Fall Problems **Name**_____

Make the direction down negative, and use g = -9.80 m/s/s for the acceleration of gravity.

1. Red Elk drops a rock from a 12.0 m tall cliff. What time does it take the rock to hit the water, and what is the velocity of impact with the ground. (Make down negative)

$X =$
$V_i =$
$V_f =$
$a =$
$t =$

Formulas

Show your steps

2. Steve Apt's group claimed that they jumped from a cliff that was so high it took them 2.70 s to hit the water. How high was this cliff? What was their velocity of impact with the water?

$X =$
$V_i =$
$V_f =$
$a =$
$t =$

Formulas

Show your steps

3. Red Elk drops a rock from a cliff that hits the water with a downward velocity of 25.0 m/s. How high is this cliff? What time did it take the rock to hit the water after he dropped it?

$X =$
$V_i =$
$V_f =$
$a =$
$t =$

Formulas

Show your steps

1) t = 1.56 s, -15.3 m/s 2) x = 35.7 m, -26.46 m/s 3) 31.9 m, 2.55 s

4. A student launches an air rocket from the ground straight upwards at a speed of 23.5 m/s. To what height does the rocket rise before going back down? What total time does the rocket spend in the air? (Time up plus the time down)

$X =$
$V_i =$
$V_f =$
$a =$
$t =$

Formulas

Show your steps

5. A batter pops a ball straight up that rises 21.0 m above the bat, before coming back down and being caught by the catcher at the same elevation the bat hit it. What was the initial upward velocity of the ball? What total time did the ball spend in the air?

$X =$
$V_i =$
$V_f =$
$a =$
$t =$

Formulas

Show your steps

6. Tom Duggan shoots a rocket into the air from the ground at some velocity. It spends 8.40 s in the air before striking the ground again. What was its launch velocity from the ground? What was its height at the top?

$X =$
$V_i =$
$V_f =$
$a =$
$t =$

Formulas

Show your steps

4) 28.2 m, 4.80 s

5) 20.3 m/s, 4.14 s

6) 41.16 m/s, 86.4 m