Application Tasks

Homework Writing Service

We propose to disassemble the three tasks below. This is a task number 10 from the previous years, recommended as training. Task number 1.

After the rain, the water level in the well can increase. The boy measures the time "t" drops of small pebbles in the well and calculates the distance to the water by the formula:

H = 5T2.

Where:

h - distance in meters,

T Fall time in seconds.

Before the rain, the fall of pebbles was 0.6 s. How much should the water level after the rain, so that the measured time changed by 0.2 s? Answer express me in meters.

Solution

Let be:

H1 Distance to Water to Rain,

H2 Distance to water after the rain.

After the rain, the water level in the well will increase, the distance to the water will decrease, and the fall time will decrease, it will become equal to:

t = 0.6 0.2 = 0.4 s

The water level will rise to:

H = H1 H2

Substitute numeric values, we get:

H = 5 0.62 - 5 0.42 = 1 m

Answer: 1. Task number 2

The height above the earthly pulled up the ball changes by law:

h (t) = 1,6 + 8t 5t2

Where:

h - height in meters,

T - time in seconds, which has passed since the throw.

How many seconds the ball will be at an altitude of at least three meters?

Solution

We define the moments of time when the ball was at an altitude of exactly three meters. To do this, solve equation:

h (t) = 3

We get:

h (t) = 3 <=>

<=> 1,6 + 8t 5t2 = 3 <=>

<=> 5t2 - 8t + 1,4 = 0 <=>

T1 = 0,2

T2 = 1,4.

Analyze the result. Because by the condition of the problem, the ball was thrown from the bottom up, it means that at the time of time

T1 = 0.2 (c) The ball was at an altitude of 3 meters, moving upwards, and at the time of time

T2 = 1.4 (c) The ball was at this height, moving from top to bottom.

Therefore, he was at an altitude of at least three meters:

T = 1.4 0.2 = 1.2 seconds.

Answer: 1.2. Task number 3.

If you quickly rotate a vertical water to the vertical plane, then the water will not be poured. When the vehicle is rotated, the power of water pressure on the bottom will not remain constant: it is maximum at the bottom and minimal in the top. Water will not pour out if the power of the pressure on the bottom will be positive in all points of the trajectory, except for the top where it can be zero. At the top point, the power force expressed in Newtona is equal to:

Where:

m - the mass of water in kilograms,

x - velocity speed in m / s,

L - the length of the spinning in meters,

G is an acceleration of free fall (consider G = 10 m / s2).

How lowered the lowest speed should be rotated, so that the water does not fall out if the length of the spinning is 40 cm? Answer express in m / s.

Solution

The task is reduced to the solution of inequality:

P (x)> 0

For a given length of the rope:

L = 0.4 m

Resolving inequality:

P (x)> 0 <=>

<=> x2> 4 <=>

<=> x> 2 m / s

Answer: 2