

Exercise 60

The height h of a projectile is a function of the time t it is in the air. The height in feet for t seconds is given by the function $h(t) = -16t^2 + 96t$. What is the domain of the function? What does the domain mean in the context of the problem?

Solution

Since the function is defined for as long as the projectile is in the air, we have to find the value(s) of t that it's on the ground. Set $h(t) = 0$ and solve for t .

$$h(t) = -16t^2 + 96t = 0$$

$$16t(-t + 6) = 0$$

$$16t = 0 \quad \text{or} \quad -t + 6 = 0$$

$$t = 0 \quad \text{or} \quad t = 6$$

Therefore, the domain is $[0, 6]$. The domain is the interval of time that the projectile is in the air and that the formula for $h(t)$ is valid.