Name ________________________________

- No calculators allowed.
- Show sufficient work to justify each answer.
- You have 15 minutes for this quiz.

1. (3 points) For the given function, use logarithmic differentiation to find a formula for $\frac{dy}{dx}$ written in terms of $x$.

$$y = \cos (3x)^{7x^5}$$

2. (3 points) Given that $\frac{dw}{dr} = 0.75w$ and $w(4) = 4$, find a formula for $w$ as a function of $r$. 
3. (4 points total) A ball is thrown straight up from an initial height of 5 feet above the ground. Until the ball hits the ground, the function \( h(t) = -10t^2 + 5t + 5 \) represents the ball’s height in feet above ground level \( t \) seconds after it was thrown.

(a) (2 points) What is the velocity of the ball when it hits the ground?

(b) (2 points) What is the maximum height of the ball?