Calculus I **Falling Bodies** Name:

1. As part of his new act, Gonzo launches himself from his cannon. The cannon is mounted on the stage 10 ft above the ground and Gonzo reaches his maximum height 8 seconds after launch.
   (a) What is Gonzo's initial velocity?

   (b) How long does it take Gonzo to hit the ground?

   (c) What is Gonzo's velocity when he hits the ground?

2. A particle moves along the x-axis with position given by $s(t) = t^3 - 12t^2 + 45t$ feet, for $0 \leq t \leq 7$.
   (a) Find the velocity and acceleration of the particle.

(b) When is the particle moving left? When is it moving right?

(c) Find the total distance traveled by the particle.

(d) When is the particle accelerating? When is it decelerating?

## Review

3. Find $y'$ if $y = \dfrac{3 - \sec x}{x + \ln x}$.

4. Find $\dfrac{d}{dz} z^3 \tan(z) + \sin(z)$.