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Active STEM Extreme Math Solution

Honors Geometry / Algebra I | Date: 2026-01-24

Problem A snowball is thrown from 1.5 m off the ground. It's vertical position is

$$h(t) = -4.9^2 + 8t + 15$$

(meters, t in seconds).

(a)Find the time when the snowball hits the ground ($h(t) = 0$, take the positive root).
(b) Determine the maximum height and the time it occurs.

Solution

Step 1: Set equal to zero Set the equation equal to zero to find h(t)=0

$$-4.9^2 + 8t + 15 = 0$$

Step 2: Solve for roots plug the equation into the quadratic formula

$$t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
$$a = -4.9$$
$$b = 8$$
$$c = 15$$

Step 3: Simplify

$$t = \frac{-8 \pm \sqrt{8^2 - 4(-4.9)(15)}}{2(-4.9)} \approx -0.17 \quad \text{or} \quad 1.802$$

We need to use 1.802 because time cannot go backwards.

Step 4: Solve for part B To find the vertex (maximum), compute.

$$\left(\frac{-b}{2a}, h(\frac{-b}{2a})\right)$$
$$t = -\frac{8}{2(-4.9)}$$
$$t = \frac{8}{9.8}$$
$$t \approx 0.816$$

Final Answer: The snowball will hit the ground 1.802 seconds after being thrown.

The snowball's maximum height will be reached after 0.816 seconds.
