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At graduation, an overly exuberant BHSEC student throws their cap up in the air, giving it an initial velocity of 144 ft/sec. The height of the cap as a function of time is given by

$$S = -16T^2 + 144T$$

where height is measured in feet and time is measured in seconds.

- a) When will the cap hit the ground?
- b) How high will the cap go?
- c) What is the *average* velocity of the cap between $T = 1$ and $T = 4$?
Discuss the significance of the sign.
- ** d) Using the technique discussed in class,
find the *instantaneous* velocity at $T = 6$.
Discuss the significance of the sign.
- ** e) What is the *instantaneous* velocity of the cap
when it is 320 feet above the ground?