

5. [11 points] A package is thrown from an airplane. The height of the package (in meters) above the ground t seconds after it was thrown from the airplane is given by the function

$$H(t) = -5t^2 - 10t + 160.$$

- a. [2 points] What is the height of the airplane at the time in which the package is thrown? Include units.

Height= _____

- b. [3 points] How many seconds does it take for the package to be 10 meters above the ground? Find your answer algebraically. Show all your work.

Answer: _____

- c. [2 points] What is the range of the function $y = H(t)$ in the context of this problem? Give your answer using either interval notation or inequalities.

Answer: _____

- d. [4 points] Another package is released from an airplane at a higher altitude. In this case, the downward velocity $V(t)$ (in meters per second) of the package t seconds after it was released is given by the function

$$V(t) = 50 - 50e^{-0.2t}$$

How long does it take for the package to have a downward velocity of 30 meters per second? Find your answer algebraically. Show all your work step by step. Your answer must be in **exact form**.

$t =$ _____