8. [10 points] A cannon fires a cannonball. Let \( p \) be a positive constant and 

\[ f(t) = -5t^2 + pt + 30 \]

be the height of the cannonball (in meters) above the ground \( t \) seconds after the cannon was fired.

a. [3 points] Find the value and a practical interpretation of the vertical intercept of the function \( f(t) \).

Vertical intercept: _____________

Practical interpretation:

b. [5 points] Complete the square to put the formula of \( f \) in vertex form. Carefully show your algebraic work step by step. Your answer may include the constant \( p \).

\[ f(t) = \frac{9}{8} \]

c. [2 points] What should be the value of \( p \) if the maximum height of the cannonball is 200 meters above the ground? Find your answer algebraically. Show all your work.

\[ p = \frac{100}{9} \]