6. [14 points] After a day of work on the farm, Percy likes to toss corn cobs from the second story window of the barn to the ground. On one toss, the corn cob follows a parabolic path \( h(x) = -x^2 + bx + c \) where \( h(x) \) is the height of the cob above the ground, in feet, when it is a horizontal distance \( x \) feet from the barn. The numbers \( b \) and \( c \) are constants.

a. [3 points] Interpret the vertical intercept of \( h(x) \) in the context of this problem.

b. [4 points] If the window is 9 feet from the ground, and the cob hits the ground 9 feet from the barn, find the values of the constants \( b \) and \( c \). Show your work.

\[
b = \underline{\phantom{0}} \\
c = \underline{\phantom{0}}
\]

c. [4 points] After the cob bounces, it follows a path given by \( p(x) = -\frac{1}{3}x^2 + 8x - 45 \) where \( p(x) \) is the height of the cob above the ground, in feet, when it is a horizontal distance \( x \) feet from the barn. By completing the square, find the maximum height the cob achieves after it bounces. You must show all steps of your calculation.

\[
\text{maximum height} = \underline{\phantom{0}}
\]

d. [3 points] Find the distance the cob is from the barn when it hits the ground for the second time. Show your work. Hint: Use the quadratic formula.

\[
distance = \underline{\phantom{0}}
\]