**8.2: Solving Systems of Equations Algebraically (day 2)**



Today we will be extending the same techniques from last day to solve more complex word problems.



Ex.1: Determine two integers such that the sum of the smaller number and twice the larger number is 46. Also, when the square of the smaller number is decreased by three times the larger, the result is 93.



1. Write a system of equations for this problem.



1. Solve the system algebraically.



Ex.2: A Canadian cargo plane drops a crate of emergency supplies to aid-workers on the ground. The crate drops freely at first before a parachute opens to bring the crate gently to the ground. The crate’s height, *h*, in meters, above the ground *t* seconds after leaving the aircraft is given by the following two equations.



 represents the height of the crate during the free fall



 represents the height of the crate with the parachute open



1. How long after the crate leaves the aircraft does the parachute open? (Nearest hundredth)



1. What height above the ground is the crate when the parachute opens? (Nearest tenth)



1. Verify your solution.



Ex. 3: The monthly economic situation of a manufacturing firm is given by the following equations.

 



1. Maximum profit occurs when marginal revenue is equal to marginal cost. How many items should be sold to maximize profit?



1. Profit is total revenue minus total cost. What is the firm’s maximum monthly profit?



Ex. 4: Solve the following system of equations using an algebraic method





