

24. Alice sets off a model rocket from the ground. At that moment, a helium balloon that her brother released a few minutes earlier is at a height of 512 feet. The balloon has been rising at a constant rate of 3 feet per second, so its height at time  $t$  is given by the function  $b(t) = 3t + 512$ . The height of the rocket at time  $t$  is given by the function  $r(t) = -16t^2 + 195t$ .

A. Which values of the domain make sense for the rocket function? Explain.

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B. Solve the system of equations by using the substitution method.

C. At what time(s)  $t$  will the balloon and the rocket be at the same height? What will be the height at each time?

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