3. (a) The time for the sound to travel from the kicker to a spectator is given by d/v, where d is the distance and v is the speed of sound. The time for light to travel the same distance is given by d/c, where c is the speed of light. The delay between seeing and hearing the kick is $\Delta t = (d/v) - (d/c)$. The speed of light is so much greater than the speed of sound that the delay can be approximated by $\Delta t = d/v$. This means $d = v\,\Delta t$. The distance from the kicker to the first spectator is $d_1 = v\,\Delta t_1 = (343\,\text{m/s})(0.23\,\text{s}) = 79\,\text{m}$. The distance from the kicker to the second spectator is $d_2 = v\,\Delta t_2 = (343\,\text{m/s})(0.12\,\text{s}) = 41\,\text{m}$.

   (b) Lines from the kicker to each spectator and from one spectator to the other form a right triangle with the line joining the spectators as the hypotenuse, so the distance between the spectators is $D = \sqrt{d_1^2 + d_2^2} = \sqrt{(79\,\text{m})^2 + (41\,\text{m})^2} = 89\,\text{m}$.