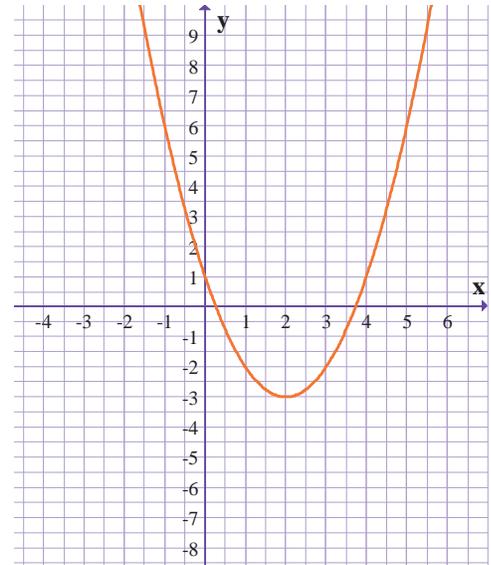


1) The revenue for a production by a theatre group is $y = -50t^2 + 300t$, where t is the ticket price in dollars. The cost for the production is $y = 600 - 50t$. Determine the ticket price that will allow the production to break even.

A company breaks even when **revenue = cost**

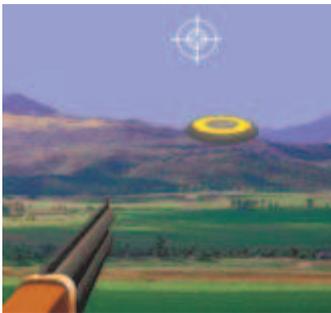
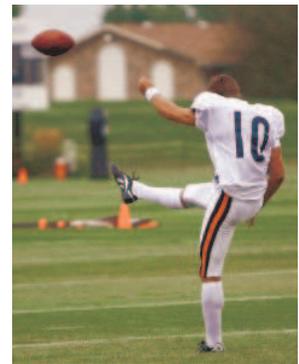
- 2) a) The graph of $y = (x - 2)^2 - 3$ is shown on the right.
 Draw lines with slope of -4 that intersect the parabola at
 i) one point, ii) two points, and iii) no points.
 b) Write the equations of the lines from part a)
 c) How are all of the lines with slope -4 that do not intersect the parabola related?



- 3) A daredevil jumps off the CN Tower and falls freely for several seconds before releasing his parachute. His height, h , in metres, t seconds after jumping can be modelled by:
 $h = -4.9t^2 + t + 360$ before he released his parachute; and
 $h = -4t + 142$ after he released his parachute.

How long after jumping did the daredevil release his parachute?

- 4) A punter kicks a football. Its height, h , in metres, t seconds after the kick is given by the equation $h = -4.9t^2 + 18.24t + 0.8$. The height of an approaching blocker's hands is modelled by the equation $h = -1.43t + 4.26$, using the same time. Can the blocker knock down the punt? If so, at what point will it happen?



- 5) Justin is skeet shooting. The height of the skeet is modelled by the equation $h = -5t^2 + 32t + 2$, where h represents the height in metres t seconds after the skeet is released. The path of Justin's bullet is modelled by the equation $h = 31.5t + 1$, with the same units. How long will it take for the bullet to hit the skeet? How high off the ground will the skeet be when it is hit?

- 6) The height, h , of a baseball, in metres, at time t seconds after it is tossed out of a window is modelled by $h = -5t^2 + 20t + 15$. A boy shoots at the baseball with a paintball gun. The trajectory of the paintball is given by the equation $h = 3t + 3$. Will the paintball hit the baseball? If so, when? At what height will the baseball be?
- 7) The revenue for a company producing electronic components is given by $y = -20x^2 - 50x + 200$, where x is the price in dollars of each component. The cost for the production is given by $y = 60x - 10$. Determine the price that will allow the production to break even.