Sugerencias para autoestudio de problemas de Libros para preparación I1

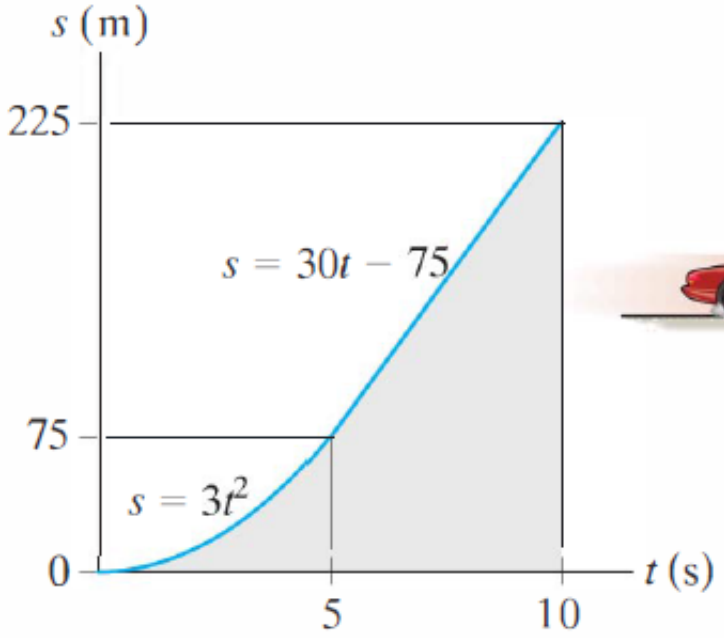
Cinemática

Enfocado en Interpretación de gráficos

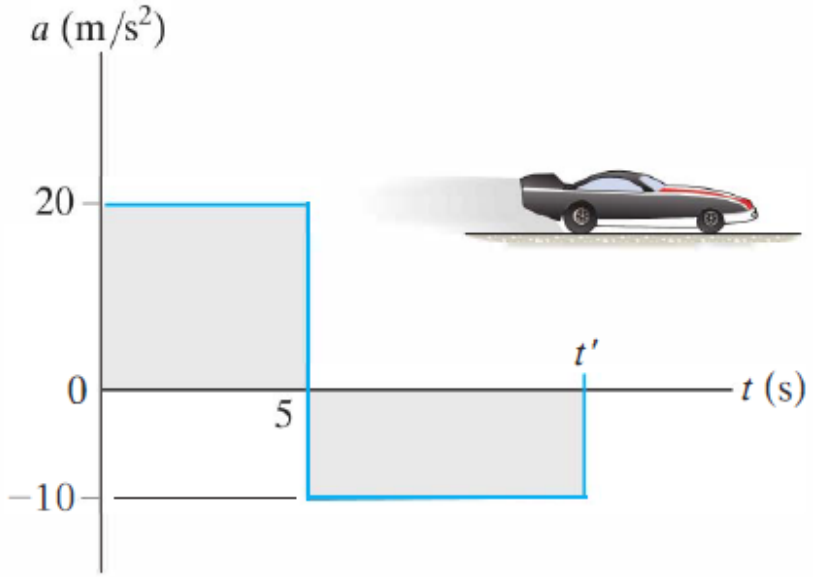
Cinemática 1-D y 2-D

Adicionalmente se sugiere enfocar en movimientos que se puede describir o modelar en sistemas de coordenadas polares y movimientos relativos (ver Taller, Clases, Ayudantías)

F12–12. The sports car travels along a straight road such that its position is described by the graph. Construct the $v-t$ and $a-t$ graphs for the time interval $0 \leq t \leq 10$ s.

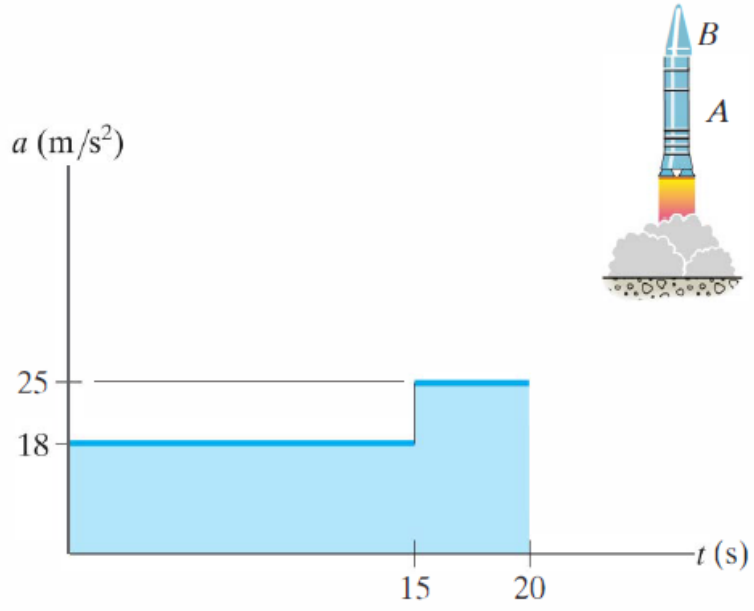


F12–13. The dragster starts from rest and has an acceleration described by the graph. Construct the $v-t$ graph for the time interval $0 \leq t \leq t'$, where t' is the time for the car to come to rest.

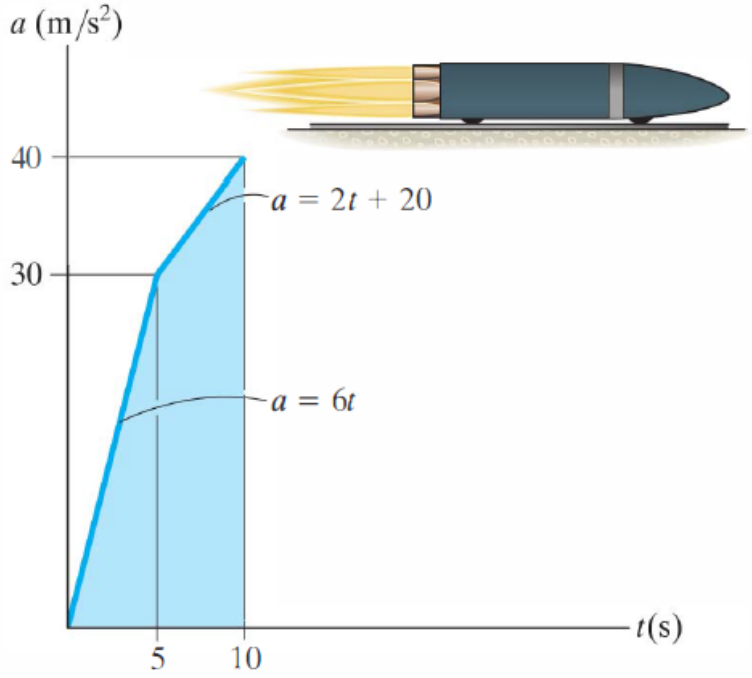


F12–13

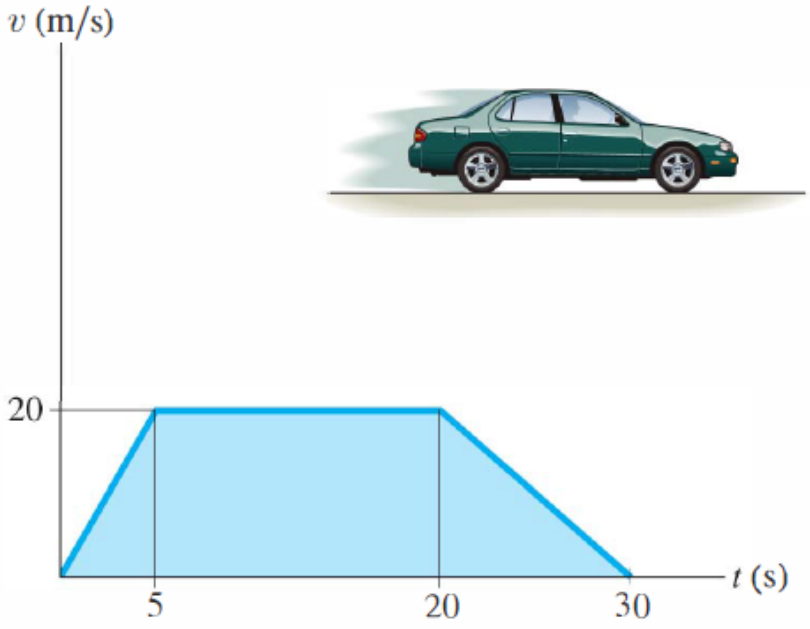
12–43. A two-stage missile is fired vertically from rest with the acceleration shown. In 15 s the first stage A burns out and the second stage B ignites. Plot the v–t and s–t graphs which describe the two-stage motion of the missile for $0 \leq t \leq 20$ s.



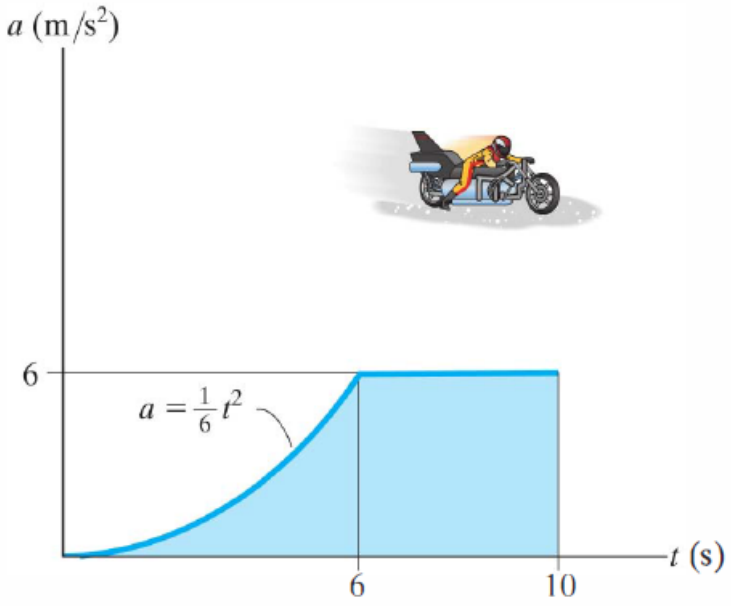
12–59. A missile starting from rest travels along a straight track and for 10 s has an acceleration as shown. Draw the v–t graph that describes the motion and find the distance traveled in 10 s.



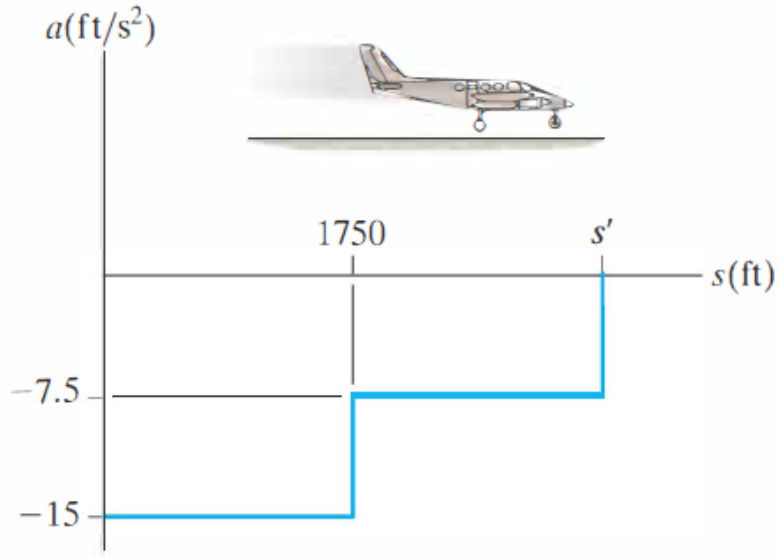
•**12–61.** The $v-t$ graph of a car while traveling along a road is shown. Draw the $s-t$ and $a-t$ graphs for the motion.



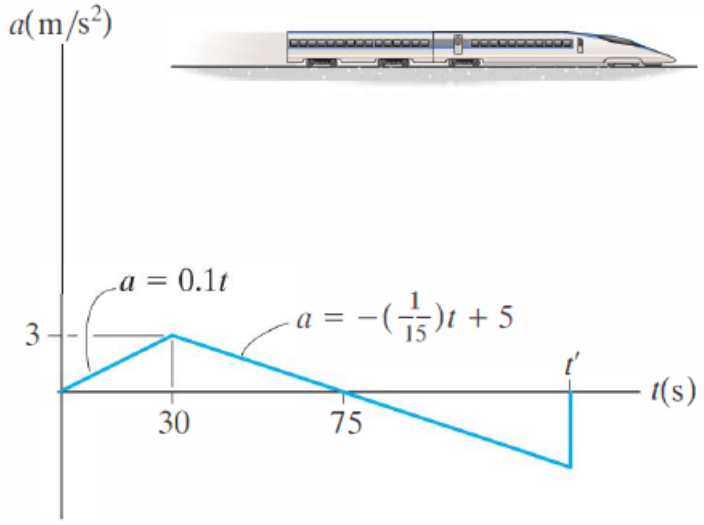
*12–60. A motorcyclist starting from rest travels along a straight road and for 10 s has an acceleration as shown. Draw the $v-t$ graph that describes the motion and find the distance traveled in 10 s.



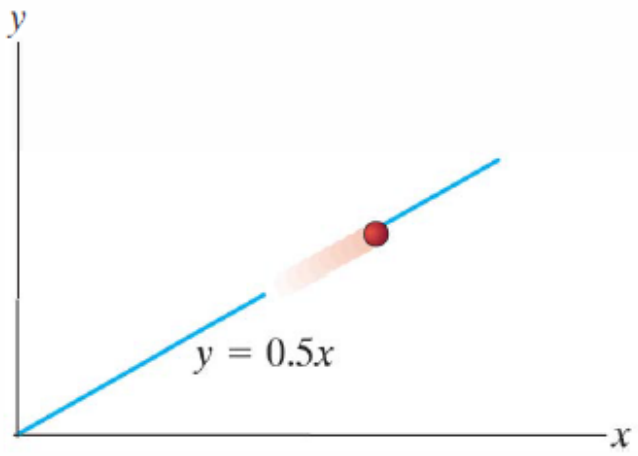
***12–68.** The airplane lands at 250 ft/s on a straight runway and has a deceleration described by the graph. Determine the distance s' traveled before its speed is decreased to 25 ft/s. Draw the s–t graph.



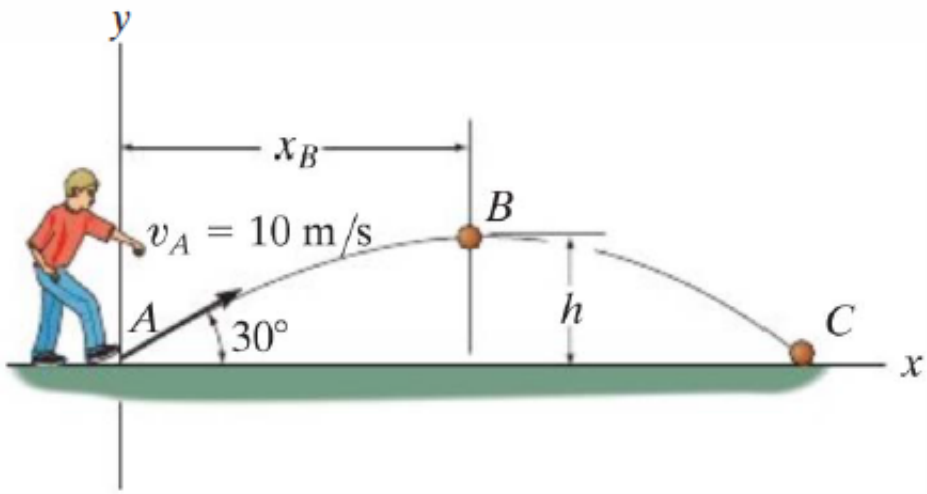
12–70. The a–t graph of the bullet train is shown. If the train starts from rest, determine the elapsed time t' before it again comes to rest. What is the total distance traveled during this time interval? Construct the v–t and s–t graphs.



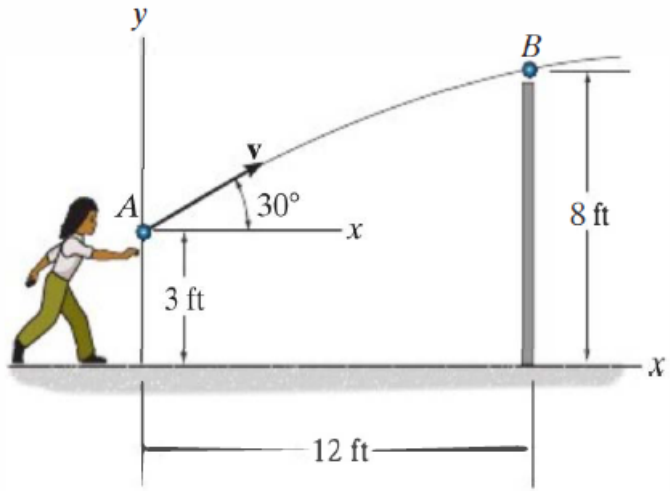
F12–18. A particle travels along a straight-line path $y = 0.5x$. If the x component of the particle's velocity is $v_x = (2t^2)$ m/s, where t is in seconds, determine the magnitude of the particle's velocity and acceleration when $t = 4$ s.



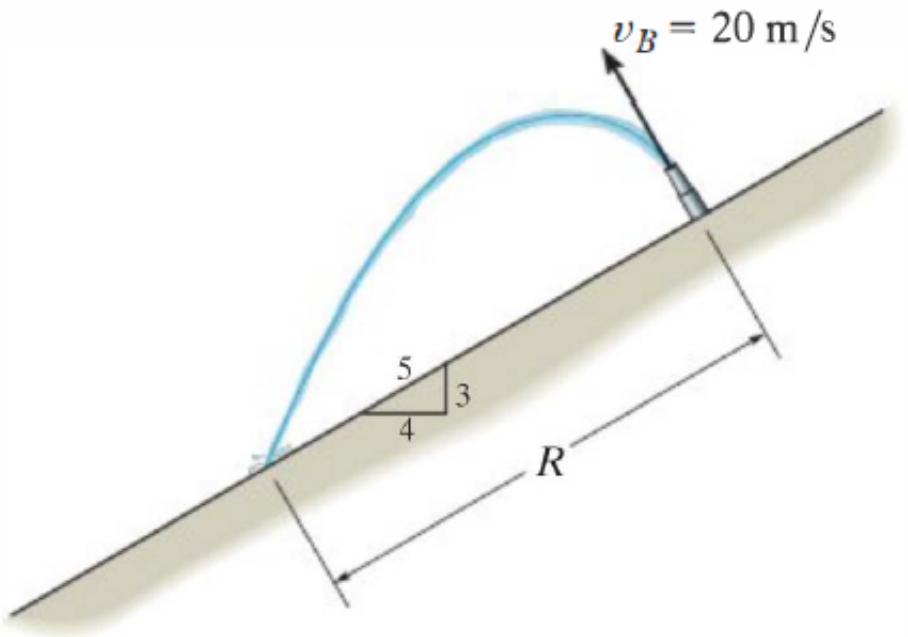
F12–22. The ball is kicked from point A with the initial velocity $v_A = 10$ m/s. Determine the range R, and the speed when the ball strikes the ground.



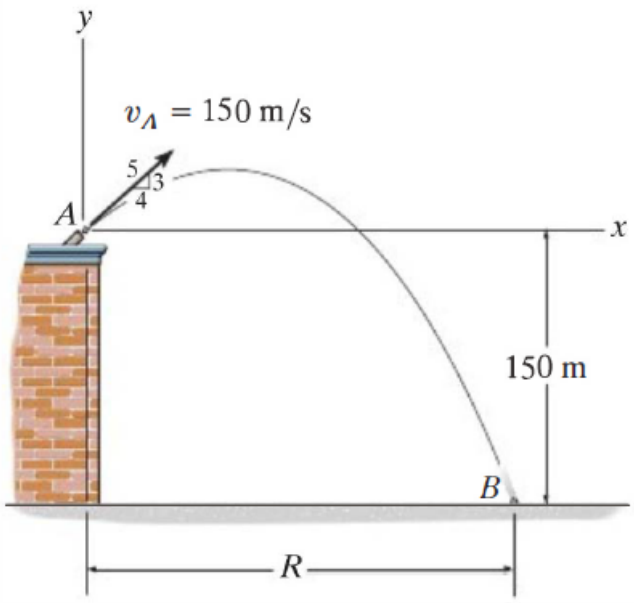
F12–25. A ball is thrown from A. If it is required to clear the wall at B, determine the minimum magnitude of its initial velocity $\mathbf{v}_A$.



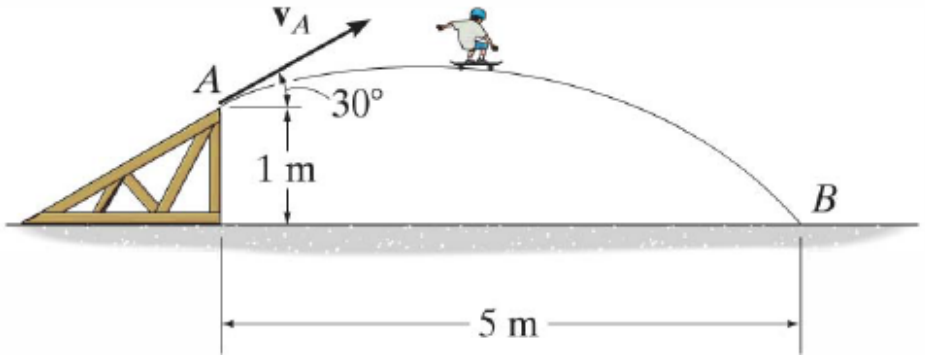
F12–24. Water is sprayed at an angle of 90° from the slope at 20 m/s. Determine the range R.



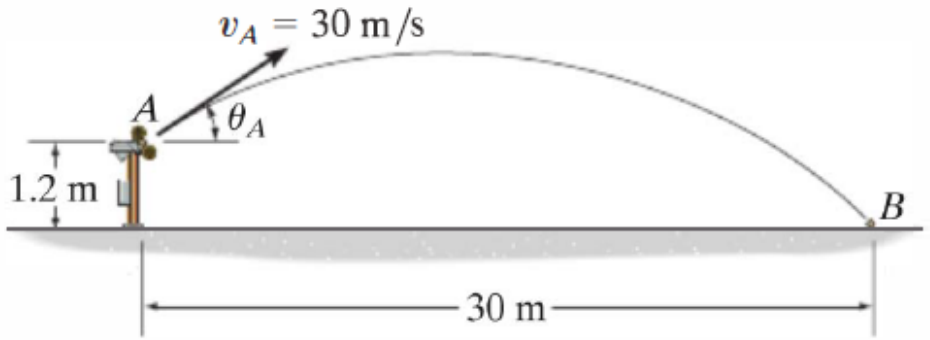
F12–26. A projectile is fired with an initial velocity of $v_A = 150$ m/s off the roof of the building. Determine the range R where it strikes the ground at B.



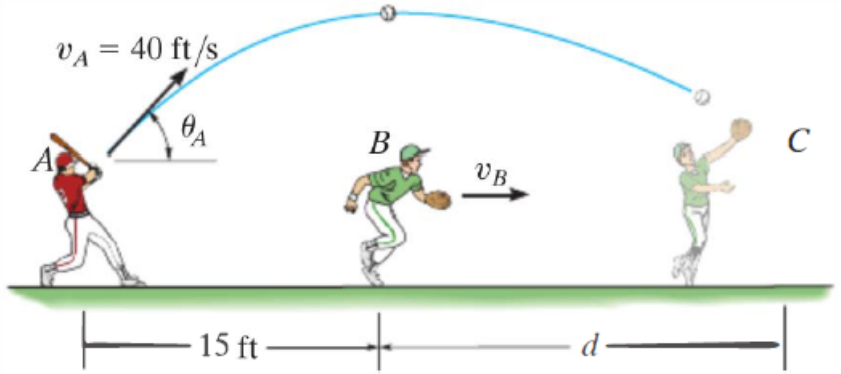
12–87. The skateboard rider leaves the ramp at A with an initial velocity v_A at a 30° angle. If he strikes the ground at B, determine v_A and the time of flight.



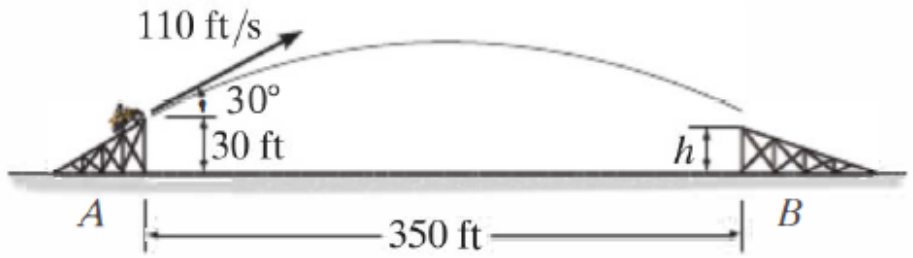
•**12–93.** The pitching machine is adjusted so that the baseball is launched with a speed of $v_A = 30\,\text{m/s}$. If the ball strikes the ground at B, determine the two possible angles θ_A at which it was launched.



***12–96.** The baseball player A hits the baseball with $v_A = 40\,\text{ft/s}$ and $\theta_A = 60°$. When the ball is directly above of player B he begins to run under it. Determine the constant speed v_B and the distance d at which B must run in order to make the catch at the same elevation at which the ball was hit.



12–95. If the motorcycle leaves the ramp traveling at 110 ft/s, determine the height h ramp B must have so that the motorcycle lands safely.



•12–109. Determine the horizontal velocity v_A of a tennis ball at A so that it just clears the net at B. Also, find the distance s where the ball strikes the ground.