

Name _____
Date _____

25. A speedboat increases its speed from 50 ft/s to 80 ft/s in a distance of 200 ft. Find (a) the magnitude of its acceleration and (b) the time it takes the boat to travel this distance.
26. A racing car reaches a speed of 50 m/s. At this instant, it decelerates uniformly using a parachute and braking system and comes to rest 5 s later. (a) Determine the deceleration of the car. (b) How far does the car travel after "turning on the brakes"?
27. The acceleration of gravity on the moon is about one sixth as great as on the earth. A stone is thrown vertically upward on the moon, with an initial speed equal to 20 m/s. (a) How long will the stone remain in motion? (b) What is the maximum height reached by the stone relative to the moon's surface?
28. A particle starts from rest from the top of an inclined plane and slides down with constant acceleration. The inclined plane is 2.0 m long, and it takes 3.0 s for the particle to reach the bottom. Find (a) the acceleration of the particle, (b) its speed at the bottom of the incline, (c) the time it takes the particle to reach the middle of the incline, and (d) its speed at the midpoint.
29. A go-cart travels the first half of a 100-m track with a constant speed of 5 m/s. In the second half of the track, it experiences a mechanical problem and decelerates at 0.2 m/s^2 . How long does it take the go-cart to travel the 100-m distance?
30. A car moving at a constant speed of 30 m/s suddenly stalls at the bottom of a hill. The car undergoes a constant deceleration of 2 m/s^2 while ascending the hill. (a) Write equations for the position and the velocity as functions of time, taking $x = 0$ at the bottom of the hill where $v_0 = 30 \text{ m/s}$. (b) Determine the maximum distance traveled by the car up the hill after stalling.
31. An electron has an initial velocity of $3.0 \times 10^5 \text{ m/s}$. If it undergoes an acceleration of $8.0 \times 10^{14} \text{ m/s}^2$, (a) how long will it take to reach a velocity of $5.4 \times 10^5 \text{ m/s}$ and (b) how far has it traveled in this time?
32. A railroad car is released from a locomotive on an incline. When the car reaches the bottom of the incline, it has a speed of 30 mi/h, at which point it passes through a retarder track that slows it down. If the retarder track is 30 ft long, what deceleration must it produce to bring the car to rest?