

Name _____

Date _____

Acceleration I

1. A car traveling in a straight line has a velocity of $+8.5 \text{ m/s}$. After 5.5 s , its velocity is $+5.0 \text{ m/s}$. What is the car's average acceleration in this time interval?
2. A car traveling at $9.0 \text{ m}\cdot\text{s}^{-1}$ accelerates at the rate of $0.8 \text{ m}\cdot\text{s}^{-2}$ for an interval of 3.0 s . Find v .
3. A ball initially at rest rolls down a hill with an acceleration of $3.3 \text{ m}\cdot\text{s}^{-2}$. If it accelerates for 6.5 s , how far will it move?
4. A bus slows down uniformly from 75.0 km/h ($21 \text{ m}\cdot\text{s}^{-1}$) to 0.0 km/h in 280 m . How long does it take to stop?
5. An excited teenager hops into a *new and different* roller coaster, one that starts at the highest point in the ride and goes *backwards*. If the roller coaster track begins by sliding backwards down the track, and accelerates from rest at $\text{m}\cdot\text{s}^{-2}$:
 - A. What is the velocity at the end of 8 s ?
 - B. What is the displacement after 8 s ?

6. A plane lands with a velocity of $120 \text{ m}\cdot\text{s}^{-1}$ and accelerates at a maximum rate of $-4.0 \text{ m}\cdot\text{s}^{-2}$.
- A. From the instant the plane touches the runway, what is the minimum time needed before it can come to rest?
 - B. What is the minimum distance the plane needs to land?
 - C. Can this plane land on a naval aircraft carrier where the runway is 2.10 km long?
 - i. insufficient information
 - ii. yes
 - iii. no
7. The first person to break the sound barrier in a car was Andy Green, in the jet-propelled car named ThrustSSC, at a speed of 763 mph ($341 \text{ m}\cdot\text{s}^{-1}$) (Nevada, 1997). He also holds the land speed record, as the fastest vehicle ever driven. If the car accelerated to $270 \text{ m}\cdot\text{s}^{-1}$ in 16 seconds, find the distance the car travels during this time.