

KINEMATIC EQUATIONS. EXAMPLES 2.2~2.3

1. When Maggie applies the brakes of her car, the car slows uniformly from 14.0 m/s to 0.0 m/s in 3.00 s. How many meters before a stop sign must she apply her brakes in order to stop at the sign?
2. A car enters the freeway with a speed of 6.4 m/s and accelerates uniformly for 3.2 km in 3.5 min. How fast (in m/s) is the car moving after this time?
3. A plane starting at rest at one end of a runway undergoes a uniform acceleration of 5.0 m/s^2 for 15 s before takeoff. What is its speed at takeoff? How long must the runway be for the plane to be able to take off?
4. A person pushing a stroller starts at 2.00 m/s, uniformly accelerating at a rate of 0.500 m/s^2 . What is the velocity of the stroller after it has traveled 5.00 m?

5. Throw a ball upward at 30 m/s from $y = 0$.

Without a calculator. Use $g = -10 \text{ m/s}^2$

- $v(1)$? $v(2)$? $v(10)$?
 - time to reach peak?
 - height?
 - speed when it comes back to $y=0$?
 - Time to reach $y=0$?
6. A ball is thrown from 2.0 m above the ground at an initial velocity of 6.0 m/s upward. How much time is the ball in the air?
 - a) Thinking
 - b) Kinematic equation
 7. Drop a camera from a 239 m cliff on Mars (-3.7 m/s^2). How much time does it take to hit the ground?

THINKING (NO CALCULATOR)

8. Tennis ball. Thrown Upward 8.0 m/s

- a) time to return to start?
- b) v when it returns to the starting height?

9. Flowerpot falls 25.0 m to the ground.

- a) time to reach ground?
- b) speed when it strikes?
- c) Check your answer with kinematic equations

10. Gymnasts A and B start from the same height above the ground.

A swings up 4.0 m/s and B swings down -3.0 m/s .

Compare their accelerations and final velocities (at ground)