Uniformly Accelerated Motion

Section 1: $v_f = v_i + at$

1. A sprinter starting from rest accelerates at 2.5 m/s² for 4.0 s. What is her final velocity?

2. A skateboarder moves at 3.0 m/s and accelerates at 1.2 m/s² for 6.0 s. What is his final velocity?

3. A cyclist slows from 10.0 m/s to 6.0 m/s in 2.0 s. What is his acceleration?

4. A train accelerates at 0.80 m/s² for 10.0 s. If it reaches v_f = 15.0 m/s, what was its initial velocity?

5. A soccer ball moving at v_i = 25.0 m/s comes to rest in 0.10 s after hitting a goalkeeper's gloves. What is its average acceleration?

6. A car is travelling at v_i = 20.0 m/s (about 72 km/h). It brakes with a = -4.0 m/s².
   (a) How long does it take to stop?
   (b) What distance does it cover in this time?

Section 2: $d = v_i t + \frac{1}{2} a t^2$

1. A ball is dropped from rest. Take a = -9.8 m/s² describing gravity downward. How far does it fall in 1.5 s?

2. A runner has v_i = 2.0 m/s and accelerates at 0.80 m/s² for 6.0 s. How far does he travel?

3. An elevator accelerates upward at 1.0 m/s² for 3.0 s and covers 12.0 m. What was its initial velocity?

4. A cyclist has v_i = 5.0 m/s and covers 60.0 m in 6.0 s. What is her acceleration?

5. A skateboarder starts from rest and accelerates at a = 2.0 m/s². If he travels 36.0 m, how long does it take?

6. A train covers 200 m in 20.0 s while accelerating at a = 0.50 m/s².
   (a) What was its initial velocity?
   (b) What was its final velocity?