Kinematic Equations

1. Write down the 3 kinematic equations on the top of the page. If you don’t remember, look back in your notes or look online.
2. What is the acceleration due to gravity? (Look back at your exhibition.)

ag = – 9.81m/s2

1. What is the equation to find acceleration?

vo = 0m/s

vf = 27m/s

t = 9s

a = ?

1. A sports car accelerates from rest to 27m/s in 9s. What is its acceleration?
2. The velocity of a train is 26.4m/s. It accelerates at -1.50m/s2. How much time is required for the train to decrease its velocity to 9.72m/s.

vo = 26.4m/s

a = -1.5m/s2

vf = 9.72m/s

t = ?

1. Starting from rest, a speedboat reaches a velocity of 3.2m/s in 2s. What is the velocity of the boat after 3 more seconds? Assume acceleration is constant.

vo = 0m/s

vf = 3.2m/s if t = 2s

a = ?

vf = ? if t = 5s

1. A runner accelerates to a velocity of 5.36m/s in 3s. His acceleration is 0.64m/s2. What was his initial velocity?
2. A basketball player is about to slam-dunk the ball. Starting from rest, she sprints to a velocity of 6m/s in 1.5s. What is her acceleration? How far did she run?

(1.5s)

vo = 0m/s

vf = 6m/s

t = 1.5s

a = 4m/s2

Δx = ?

1. A jetliner lands with a velocity of 69m/s. Once it touches down, it has 750m of runway to reduce its speed to 6.1m/s. Find the acceleration of the plane once it touches the ground.

vo = 69m/s

vf = 6.1m/s

Δx = 750m

a = ?

1. A skier accelerates down a slope at 1.6m/s2 starting from rest. How far has she gone after 5s?

(5s)

vo = 0m/s

a = 1.6m/s2

t = 5s

Δx = ?

1. A soccer player, running at a velocity of 2.6m/s, accelerates at 0.45m/s2 for the next 18m. What is her velocity at the end of the run?

vo = 2.6m/s

a = 0.45m/s2

Δx = 18m

vf = ?

1. A truck traveling at 33m/s comes to a halt by accelerating at -11m/s2. How far does the truck travel in the process of stopping?

vo = 33m/s

vf = 0m/s

a = -11m/s2

Δx = ?

1. A baseball is thrown upward with an initial velocity of 35m/s. What is its speed after 2s? (Recall: what is the acceleration due to gravity?)

vo = 35m/s

ag = -9.81m/s2

t = 2s

vf = ?

1. From her bedroom window, a girl drops a water-filled balloon to the ground, 6m below. If the balloon is released from rest, how long is it in the air?

Δx = –6m

vo = 0m/s

ag = -9.81m/s2

t = ?

vf = ?