

Problem 1.

A subway train is initially moving at 8 m/s. The conductor applies the brakes, producing a constant deceleration. After the train has moved 120 m, it has a speed of 4 m/s.

- a) What is the magnitude of the acceleration?
- b) How long did it take to travel that 120 m?
- c) How far will it be from its initial location after an additional 10 s?

Problem 2.

A pilot heads her airplane due north at a speed, relative to still air, of 300 km/hr. There is a steady wind blowing. One hour later, she arrives at a location that is 330 km north and 40 km east of where she started.

What is the speed and direction of the wind?

Problem 3.

A 3 kg fish is suspended above the ground on a massless fishing line. The fish is a largemouth bass, not a red herring.

- a) Assuming the fish is at rest, what is the tension in the fishing line?
- b) Now assume that you are lowering the fish in such a way that it moves downward with a constant speed of 0.5 m/s. What is the tension in the line now?
- c) Now assume that you are lowering the fish in such a way that it moves with a downward acceleration of 4.9 m/s^2 . What is the tension in the line now?

Problem 4.

A student throws a raw egg at a fraternity house. The egg's initial speed is 30 m/s. The horizontal distance from the student to the house is 15 m. The egg hits the house 1 second after it is thrown. You can ignore air resistance.

- a) At what initial angle θ was the egg thrown?
- b) At what height is the egg when it hits the house?
- c) How fast is the egg travelling when it hits the house?