

## **Problem set to be solved in class 2 of December**

### **Problem 1.1**

**A boat is traveling across a river that flows due east at 8.50 m/s. The compass heading of the boat is  $15.0^\circ$ . Relative to the water, the boat is traveling straight forward (in the direction in which the boat is pointing) at 11.2 m/s. How fast and which way is the boat moving relative to the banks of the river?**

### **Problem 1.2**

**A rock is thrown straight upward. It leaves the throwers hand at a height 1.5 m above the surface of the earth with a speed 15 m/s. How high above the surface of the earth does the rock go? Neglect air resistance.**

### **Problem 1.3**

**A projectile is launched with a velocity of 11 m/s at an angle of  $28^\circ$  above the horizontal over flat level ground from a height of 2.0 m above ground level. How far forward does it go before hitting the ground? (Assume that air resistance is negligible.) Find the magnitude of projectile's final velocity as well.**

Homework #1/1

**Problem#1**

**Two cars are traveling with constant speed, one due north at 60 km/h and another one due north-east at 40 km/h. What is relative speed of one car with respect to another?**

**Problem#2**

**A car traveling along a straight flat highway is moving along at 41.0 m/s when it passes a police car standing on the side of the highway. 3.00 s after the speeder passes it, the police car begins to accelerate at a steady 5.00 m/s<sup>2</sup>. The speeder continues to travel at a steady 41.0 m/s. How long does it take for the police car to catch up with the speeder**

Homework #1/2

**Problem#1**

Two cars are traveling with constant speed, one due north at 50 km/h and another one due west at 40 km/h. What is relative speed of one car with respect to another?

**Problem#2**

A car traveling along a straight flat highway is moving along at 41.0 m/s when it passes a police car standing on the side of the highway. 3.00 s after the speeder passes it, the police car begins to accelerate at a steady 5.00 m/s<sup>2</sup>. The speeder continues to travel at a steady 41.0 m/s. How far does the police car have to travel to catch up with the speeder?

Homework #1/3

**Problem#1**

Two cars are traveling with constant speed, one due north at 65 km/h and another one due south at 80 km/h. What is relative speed of one car with respect to another?

**Problem#2**

A car traveling along a straight flat highway is moving along at 41.0 m/s when it passes a police car standing on the side of the highway. 3.00 s after the speeder passes it, the police car begins to accelerate at a steady 5.00 m/s<sup>2</sup>. The speeder continues to travel at a steady 41.0 m/s. How fast is the police car going when it catches up with the speeder?

Homework #1/4

**Problem#1**

Two cars are traveling with constant speed, one due west at 60 km/h and another one due east at 50 km/h. What is relative speed of one car with respect to another?

**Problem#2**

A rock is thrown straight upward. It leaves the throwers hand at a height 1.5 m above the surface of the earth with a speed 5 m/s. What maximum height will the rock reach? Neglect air resistance.

Homework #1/5

**Problem#1**

**Two cars are traveling with constant speed due north, one at 65 km/h and another one at 80 km/h. What is relative speed of one car with respect to another?**

**Problem#2**

**A rock is thrown straight upward. It leaves the throwers hand at a height 1.5 m above the surface of the earth with a speed 15 m/s. How long it will take the rock to reach the crown (the highest point of trajectory)? Neglect air resistance.**

Homework #1/6

**Problem#1**

**Two cars are traveling with constant speed due west, one at 53 km/h and another one at 80 km/h. What is relative speed of one car with respect to another?**

**Problem#2**

**A rock is released without initial speed at a height 1 m above the surface of the earth. What is the velocity of the rock at the moment it hits the ground? Neglect air resistance.**

Homework #1/7

**Problem#1**

Two cars are traveling with constant speed, one due north at 45 km/h and another one due south at 80 km/h. What is relative speed of one car with respect to another?

**Problem#2**

A rock is released without initial speed at a height 1 m above the surface of the earth. How long it will take the rock to reach the ground? Neglect air resistance.



Homework #1/8

**Problem#1**

Two cars are traveling with constant speed, one due south at 55 km/h and another one due west at 60 km/h. What is relative speed of one car with respect to another?

**Problem#2**

A rock is thrown straight upward. It leaves the throwers hand at a height 1.5 m above the surface of the earth with a speed 15 m/s. What maximum height will the rock reach? Neglect air resistance.

Homework #1/9

**Problem#1**

Two cars are traveling with constant speed, one due east at 50 km/h and another one due west at 80 km/h. What is relative speed of one car with respect to another?

**Problem#2**

A rock is thrown straight downward. It leaves the throwers hand at a height 1.5 m above the surface of the earth with a speed 1 m/s. What is the velocity of the rock at the moment it hits the ground? Neglect air resistance.

Homework #1/9

**Problem#1**

Two cars are traveling with constant speed, one due south at 40 km/h and another one due east at 30 km/h. What is relative speed of one car with respect to another?

**Problem#2**

A rock is thrown straight upward. It leaves the throwers hand at a height 1.5 m above the surface of the earth with a speed 15 m/s. How long it will take the rock to reach the crown (the highest point of trajectory)? Neglect air resistance.