

## Wednesday Workshop Problems for Solution Posting - Week 8

Goals: all group members should understand problem, solution, and steps in between. Group should collaboratively produce a solution which is clear, complete, and correct, shows all steps/reasoning with all steps valid, and that aims to be a document that someone else can learn from. You are individually responsible for posting a Review to two (2) solutions by 6:00 pm Friday. Problem A groups Review Problem B solutions. Problem B groups Review Problem C solutions. Problem C groups Review Problem D solutions. Problem D groups Review Problem A solutions.

### A. based on Quiz 6 #2 & #3:

1) **REQUIRED ELEMENTS FOR A GOOD SOLUTION:** i) A free-body force diagram showing the two forces acting on the man: the weight force (the force of gravity due to the earth on the man) and the scale force (the normal force of the scale on the man); ii) An equation using Newton's second law in terms of symbols on the free-body force diagram; iii) an explanation of the magnitude and direction of the acceleration; iv) all algebra steps clearly shown.

An 83-kg man stands on a bathroom scale inside an elevator.

- The elevator accelerates upward from rest at a rate of  $0.75 \text{ m/s}^2$  for 2.0s. What does the scale read during this 2.0s?
- The elevator continues upward at a constant velocity for 7.30s. What does the scale read now?
- While still moving upward, the elevator's speed decreases at a rate of  $0.35 \text{ m/s}^2$  for 3.00s. What is the scale reading during this time?

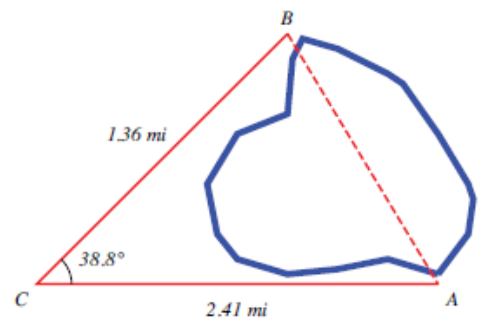
2) **REQUIRED ELEMENTS FOR A GOOD SOLUTION:** i) a careful vector diagram showing the individual displacements along with the resultant displacement asked for; ii) a table organizing each vector along with its x- and y- components (as in Physics Lab 12).

Pizza Pan leaves Pizzaland to deliver a pizza to the Darlings. He travels due East for 0.5 km, then  $30^\circ$  North of West for 1.0 km, and then due South for 2.0 km, ending up at the Darlings. Determine how far and in what direction Pan would have needed to travel in order to go directly from Pizzaland to the Darlings.

### B. based on Pre-Calculus Problem Set 6 #3:

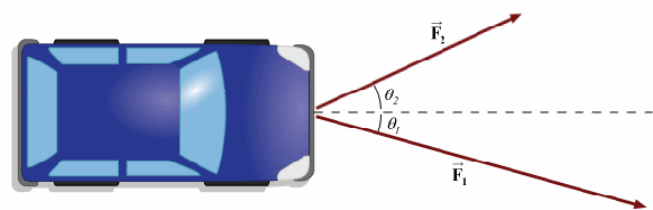
To find the distance across a small lake, a surveyor has taken the measurements shown in the diagram (not drawn to scale). Find the distance across the lake using this information by three different methods:

- Draw an accurate scale drawing;
- Draw a line that creates two right triangles from the triangle shown, and use trigonometry and the Pythagorean formula;
- Treat it like a vector problem, with the vector pointing from A to C plus the vector pointing from C to B plus the vector pointing from B to A adding up to equal zero.

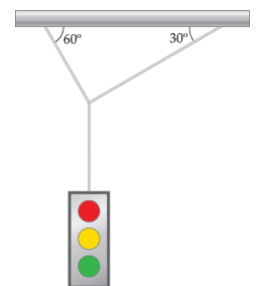


### C. based on Physics Problem Set 6 #13 & #16:

1) Harry enlists the help of his friend Ron to move his car (mass 3500 kg). They apply forces to the car as shown in the diagram. Here  $F_1 = 431 \text{ N}$  and  $F_2 = 340 \text{ N}$ , and friction is neglected. The diagram shows a top down view, with  $\theta_1 = 25^\circ$  and  $\theta_2 = 12^\circ$ . (Assume the car faces the positive x-axis before the forces are applied.) Determine the magnitude and direction of the car's acceleration.



2) A 17.6-kg traffic light is suspended from two cables as shown in the figure. Find the tension in each cable.



### D. based on Pre-calculus Problem Set 6 #6:

The four sequential sides of a quadrilateral have lengths  $a = 4.4$ ,  $b = 7.7$ ,  $c = 9.1$ , and  $d = 10.4$  (all measured in yards). The angle between the two smallest sides is  $\alpha = 94^\circ$ . Determine the area of the figure.