

Wednesday Workshop Problems for Solution Posting - Week 7

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.

- Collaboratively produce a public solution on whiteboards.
- Get feedback on how solution might be improved. Revise solution based on feedback. Take a picture of the revised solution.
- Choose a group member to post the solution. Solution must be posted by 11:59 pm tonight. Please follow the detailed instructions from the Solution Postings and Reviews Overview (available at the Week 2 Calendar page).
- 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 5 #4 and Physics Problem Set 5 #14:

Two forces **P** and **Q** act on an object of mass 10.0kg. When both forces are directed to the right, the magnitude of the acceleration of the object is 1.50m/s^2 . However, when the force **P** is directed to the right and the force **Q** is directed to the left, the object has an acceleration of 0.75m/s^2 . Determine the magnitude of the two forces.

Note: Good solutions will contain or address the following, though not necessarily in this order: a clear free-body force diagram; start with a general form of Newton's second law before plugging in numbers; shows all the algebra moves clearly; shows two different algebraic solutions; briefly discuss why weight force is not considered in this problem.

B. based on Quiz 5 #3, Physics Problem Set 5#5, and Math Lab 6:

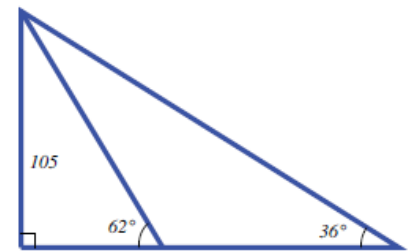
Jack and Jill run around a circular track at the same linear (tangential) speed. Jack's radius around the track is 0.5 km, while Jill's radius around the track is 0.51 km. Jack completes 8 laps in 2 hours.

- Determine Jack's angular speed in rad/sec.
- In the time it took Jack to complete 8 laps, how many laps has Jill gone (answer to the nearest hundredth of a lap)?

C. based on Pre-calculus Problem Set 5 #20 & #22:

a) A radio tower is located 300 feet from a building. From a window in the building, a person determines that the angle of elevation to the top of the tower is 30 degrees and that the angle of depression to the bottom of the tower is 45 degrees. How tall is the tower?

b) Given the figure to the right, determine the lengths of all the other sides of the various triangles shown.



D. based on Quiz 5 #5 and Physics Problem Set 5 #13:

You lift a box straight up applying a force of 103 N and the box accelerates upwards at 0.5m/s^2 .

- Determine the mass of the box.
- If instead you applied an upward force of 95.5 N, what would be the acceleration of the box?

Note: Good solutions to part a) will contain or address the following, though not necessarily in this order: a clear free-body force diagram; start with a general form of Newton's second law before plugging in numbers; discuss why the answer is not 206 kg both in terms of physics principles and also in terms of sense-making. A good solution to part b) will also include sense-making of the final answer.