AP Physics: Short Lab 4-B
Tension at Unequal Angles

Name _____   Hour _____

Lab Partners _____

Purpose:

Analyze relationships between horizontal tension, vertical tension, and resultant tension in situations with unequal angles.
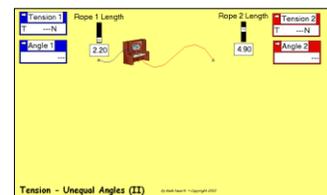
Equipment:

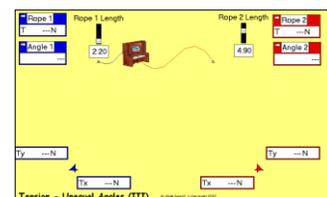- Interactive Physics computer software

Procedures:

1. Open the Interactive Physics file "*Tension – Unequal Angles (I)*". Run the simulation and study the two ropes used to support the piano. In the space below, make a prediction regarding the tension in the 2 ropes. Will they share the tension equally? If not, which one will have a greater tension? Why do you think so?
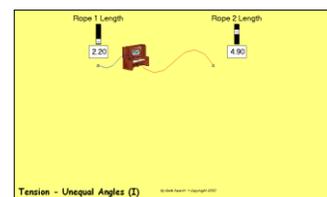
2. Open the Interactive Physics file "*Tension – Unequal Angles (II)*". Run the simulation and study the angles of the 2 ropes and their overall tension. Was your prediction correct?

3. Open the Interactive Physics file "*Tension – Unequal Angles (III)*". Run the simulation and study the horizontal and vertical components of tension in each rope. How do the horizontal tension components compare to each other? How do the vertical tension components compare to each other? If you know the angles of both ropes and the relationship between the horizontal components of tension, can you predict how the resultant tension values will compare between the two ropes?

4. Experiment with different rope angles by increasing or decreasing the lengths of the two ropes. *(NOTE: You may need to try a different situation if the program shows an error message or gives tension values of zero.)* Each time, observe the angles of the two ropes and the resultant tension values. Can you now predict which rope will have a greater tension?

5. Open the Interactive Physics file "*Tension – Unequal Angles (IV)*". Run the simulation and study the angles and horizontal and vertical components of tension in each of the 3 situations. Does the actual length of the two ropes appear to have a direct impact on how the tension is distributed between the ropes? Justify your answer.