

# Topics in Algebra, Trigonometry and Pre-Calculus

4th March 2010

## Part I Round-up homework

*Instructions:*

*The relevant units are: Trigonometry, Applications of Trigonometry and Properties of Trigonometric functions. If you are doing one of these units then answer two of the questions below. If you are doing two of these units then answer four of the questions below, and finally if you are doing all of the units then answer all of the questions.*

1. What is the angle of elevation of a railroad track that rises 349 feet horizontally over a vertical distance of 1000 feet.
2. Find the angle of inclination of a 6 foot long treadmill if the front is 4 inches above the ground. Note there are 12 inches in a foot.
3. The angle of elevation to the top of a radio antenna on top of a building is  $53.4^\circ$ . After moving 200 feet closer to the building the angle of elevation is  $64.3^\circ$ . Find the height of the building if the height of the antenna is 180 feet.
4. Two buildings are 240 feet apart. The angle of elevation from the top of the shorter building to the top of the other building is  $22^\circ$ . If the shorter building is 80 feet high, how high is the taller building.
5. For best illumination of a piece of art, a lighting specialist for an art gallery recommends that a ceiling-mounted light be 6 feet from the placement of the art and that the angle of depression of the light be  $38^\circ$ . How far from the wall should the light be placed so that the recommendations of the specialist are met. Note that the art extends outwards 4 inches from the wall.
6. From a point  $A$  on a line from the base of the Washington Monument, the angle of elevation to the top of the monument is  $42^\circ$ . From a point 100

feet away on the same line, the angle of elevation to the top is  $37.8^\circ$ . Find the approximate height of the Washington Monument.