

Task

Angle of the Sun

The sides and angles of right triangles are related. Right triangle trigonometry can be used to find side lengths or angle measures.

You are a scientific historian, trying to learn more about the methods used to tell time before the invention of the clock. All you know so far is that people used shadows to tell time. Your task is to apply your knowledge of trigonometry to make a correlation between shadows and the angle of elevation of the sun. In order to better understand how these shadows might have been used to tell time, you will be conducting an experiment. You will measure the shadow cast by an object of fixed height at four different times throughout the day. In a written report, to be turned in to the teacher, you will include a series of diagrams that chart the sun's progress, calculations that show how inverse tan was used to calculate the angle of elevation, and conclusions regarding the relationship between time of day, shadows, and various angles of the sun. All conclusions must be justified by results of the experiment. Finally, you will share your findings with your classmates during short presentations (oral presentation will not be graded). Your work will be judged by completeness of following directions, accuracy in calculations and diagrams, and understanding of the concepts revealed in your conclusions.

Rubric for Angle of the Sun

Name _____

_____/4 **Introduction**

- Identifies the object used in the experiment
Yes _____ No _____
- Brief summary of the experiment
Yes _____ No _____

_____/4 **Diagrams**

- 4 accurate diagrams for the 4 different times of day
 1. Yes _____ No _____
 2. Yes _____ No _____
 3. Yes _____ No _____
 4. Yes _____ No _____

_____/4 **Calculations**

- Accurate calculations shown for the 4 different angles of elevation
 1. Yes _____ No _____
 2. Yes _____ No _____
 3. Yes _____ No _____
 4. Yes _____ No _____

_____/8 **Conclusions**—make conclusions about the following relationships (x2)

- the relationship between the length of the shadow and angle of elevation of the sun is described accurately
Yes _____ No _____
- the relationship between the length of the shadow and the time of day is described accurately
Yes _____ No _____
- the relationship between the angle of elevation of the sun and the time of day is described accurately
Yes _____ No _____
- comment on other factors that may have influenced your results

_____/20 points