

TRIGONOMETRY PROJECT

Calculating the Angle of Elevation of the Sun

Trigonometry is all around us! Right triangles can be found in many daily situations. In this project you will apply your knowledge of trigonometry to shadows in order to calculate the angle of elevation to the sun at different times of day.

To calculate the angle of elevation of the sun use following the procedure:

- Measure your height and the length of the shadow you cast at two different times of day (at least 3 hours apart)
- Record the times and measurements (with units)
- Draw the right triangle in this scenario
- Label the sides of your drawing with your measurements and angle of elevation
- Solve for the angle of elevation while clearly showing all your steps

Don't forget that you need to do the procedure above twice for two different times of day!

| | Points |
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| Once you have done the calculations above, answer the following questions: | |
| 1. In several sentences, explain the right triangle drawings you used to model the shadow scenario. Make sure it answers the following: a. What does each side length signify? In particular explain what does the hypotenuse in your drawing signify in the real world? b. Explain why the angle you chose is the angle of elevation of the sun. | ____ / 12 ____ / 4 |
| 2. From your measurements, when was your shadow the longest? What was the angle of elevation of the sun at this time? | ____ / 4 |
| 3. From your measurements, when was your shadow the shortest? What was the angle of elevation of the sun at this time? | ____ / 4 |
| 4. During what time of day do you think the shadow you cast will be longest? Explain why using your knowledge of trigonometric ratios. (Hint: Make sure you mention the angle of elevation, your height and a trig ratio that will help explain why the shadow is longest at this time of day) | ____ / 15 |
| 5. During what time of day do you think the shadow you cast will be shortest? Explain why using your knowledge of trigonometric ratios. (Use the hint from above except this time you are explaining why the shadow at this time of day is shortest) | ____ / 15 |
| Below is a checklist of all the components you will need to submit: | |
| <input type="checkbox"/> Tables of your height, shadow length (with units) and time of day | ____ / 6 |
| <input type="checkbox"/> Drawing of the right triangles | ____ / 4 |
| <input type="checkbox"/> Label the drawings with your measurements and the angle of elevation | ____ / 6 |
| <input type="checkbox"/> Use the correct trigonometric ratio | ____ / 10 |
| <input type="checkbox"/> Show all steps and calculations when solving for the angle of elevation | ____ / 20 |
| <input type="checkbox"/> Answers to questions #1-5 | |