

Math by Design
Windjammer Environmental Center Constructed Response Questions

Right Triangle Concepts

The new tower has a height of 150 feet. Several cables have been used to help support the tower. The base of one cable is attached on the ground at a spot 30 feet from the center of the base of the tower.



Step A: What is the length of this cable?

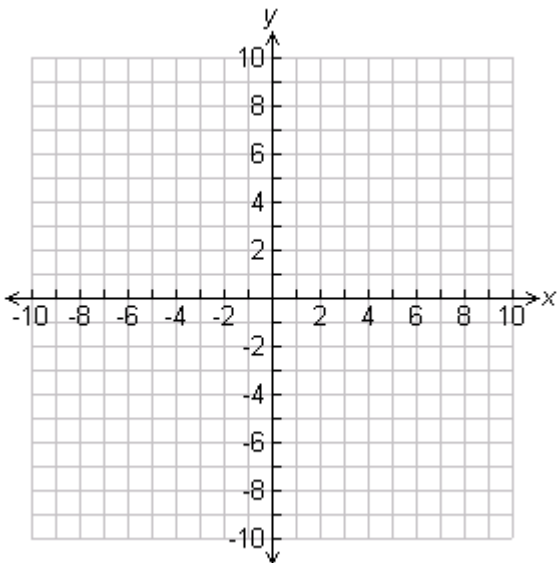
Step B: Use what you know about the Pythagorean Theorem to explain how you determined the length of the cable. Use words, numbers, and/or symbols in your explanation.

Transformations

A segment with endpoints located on a coordinate plane at $(2, 5)$ and $(7, 3)$ is rotated 90 degrees counterclockwise about the origin.

Step A: What are the coordinates of the endpoints of the segment after the rotation?

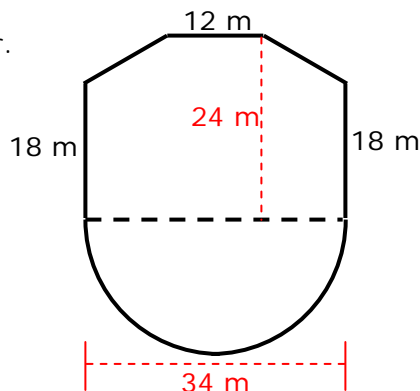
Step B: Use what you know about rotations to explain how you determined the coordinates of the endpoints. Use words, numbers, and/or symbols in your explanation.



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Area of a Composite Figure

The figure shows the floor plan for the new theater.



Step A: What is the total area of the theater?

Step B: Use what you know about finding the area of a composite figure to explain how you determined the area of the theater. Use words, numbers, and/or symbols in your explanation.

Volume of a Cylinder

The cake designer is making a round layer cake for a party with 50 people. A layer of cake has a height of 4 inches. The designer can make a cake with a 10-inch diameter or a cake with a 12-inch diameter. He needs at least 8 in^3 of cake per person.

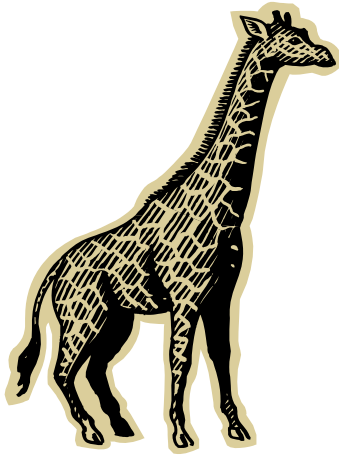


Step A: Which of the sizes of cake should the designer use in order to have enough cake for all 50 people?

Step B: Use what you know about finding the volume of a cylinder to explain how you determined the correct size to use. Use words, numbers, and/or symbols in your explanation.

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Proportional Reasoning



An artist is drawing a giraffe. She knows that a male giraffe is about 18 feet tall and that his shoulder is about 11.5 feet above the ground. In the picture, the height of the giraffe will be about 10 inches.

Step A: In the picture, what should be the height of the giraffe's shoulder above the ground?

Step B: Use what you know about proportional reasoning to explain how you determined the height of the giraffe's shoulder. Use words, numbers, and/or symbols in your explanation.