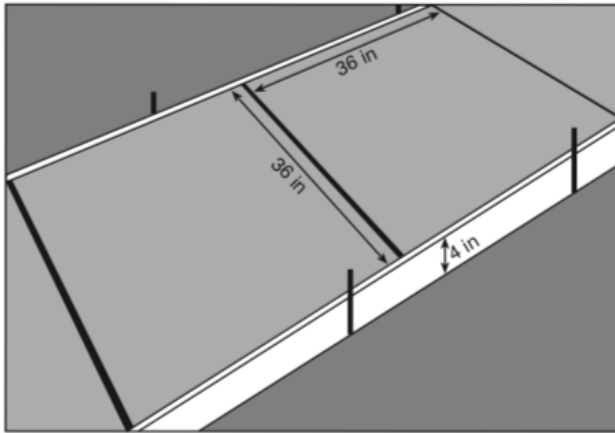


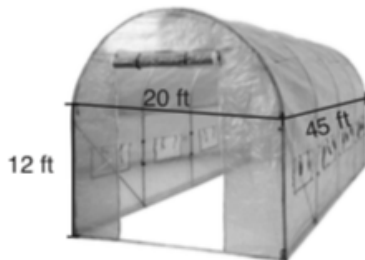
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### 10.10 Do Now: Volume, density, trig review

1. Sarah needs to replace two concrete sections in her sidewalk, as modeled below. Each section is 36 inches by 36 inches and 4 inches deep.

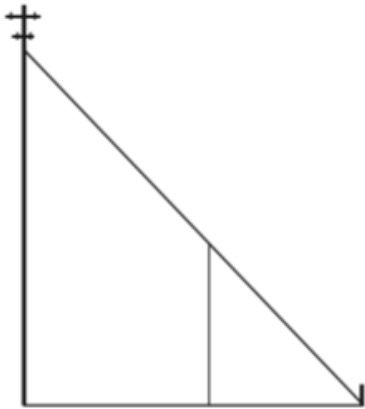


- (a) Determine and state the volume of concrete needed, *in cubic feet*.
  - (b) Sarah can mix her own concrete for \$3.25 per cubic foot. How much money will it cost her to replace the two concrete sections?
- 
2. The greenhouse pictured below can be modeled as a rectangular prism with a half-cylinder on top. The rectangular prism is 20 feet wide, 12 feet high, and 45 feet long. The half-cylinder has a diameter of 20 feet.



To the *nearest cubic foot*, what is the volume of the greenhouse?

3. In a right triangle, the acute angles have the relationship  $\sin x = \cos 27$ . What is the value of  $x$ ?
4. If  $\sin(2x - 11)^\circ = \cos(4x + 11)^\circ$ , what is the value of  $x$ ?
5. In the model below, a support wire for a telephone pole is attached to the pole and anchored to a stake in the ground 15 feet from the base of the telephone pole. Sachem places a 6-foot wooden pole under the support wire parallel to the telephone pole, such that one end of the pole is on the ground and the top of the pole is touching the support wire. He measures the distance between the bottom of the pole and the stake in the ground.

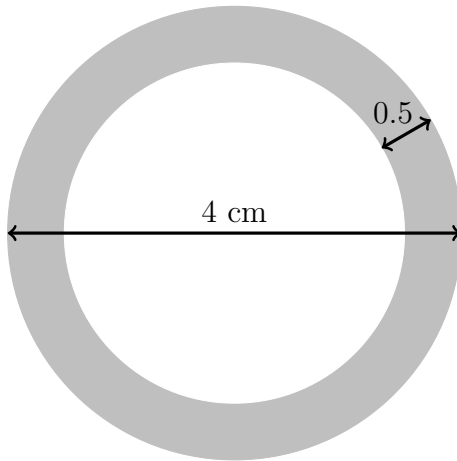


Sachem says he can approximate how high the support wire attaches to the telephone pole by using similar triangles. Explain why the triangles are similar.

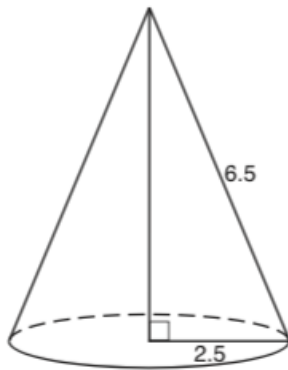
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### 10.10 Classwork: Cross sections and 3-dimensional rotations

1. A bakery sells hollow chocolate spheres. The larger diameter of each sphere is 4 cm. The thickness of the chocolate of each sphere is 0.5 cm. Determine and state, to the nearest tenth of a cubic centimeter, the amount of chocolate in each hollow sphere.

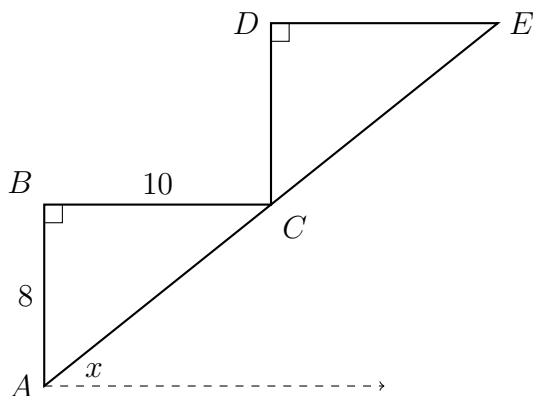


2. As shown in the diagram below, the radius of a cone is 2.5 cm and its slant height is 6.5 cm.



- (a) Find the height of the cone.
- (b) How many cubic centimeters are in the volume of the cone? Express your answer in terms of  $\pi$ .

3. Which three-dimensional figure will result when a rectangle 6 inches long and 5 inches wide is continuously rotated about the longer side?
- (a) a rectangular prism with a length of 6 inches, width of 6 inches, and height of 5 inches
  - (b) a rectangular prism with a length of 6 inches, width of 5 inches, and height of 5 inches
  - (c) a cylinder with a radius of 5 inches and a height of 6 inches
  - (d) a cylinder with a radius of 6 inches and a height of 5 inches
4. An isosceles right triangle whose legs measure 6 is continuously rotated about one of its legs to form a three-dimensional object. The three-dimensional object is a
- (a) cylinder with a diameter of 6
  - (b) cylinder with a diameter of 12
  - (c) cone with a diameter of 6
  - (d) cone with a diameter of 12
5. A right cylinder is cut perpendicular to its base. The shape of the cross section is a
- (a) circle
  - (b) cylinder
  - (c) rectangle
  - (d) triangular prism
6. A staircase riser is cut as a series of congruent triangles with each step's "rise" equal to 8 inches, and the "run" of each step is 10 inches, as shown below. ( $AB = 8$  and  $BC = 10$ ) Find the diagonal length of the two-step riser, the distance  $AE$ , to the nearest inch.



What is the angle of inclination of the staircase,  $x$ ?