

The Mount Triangle



History

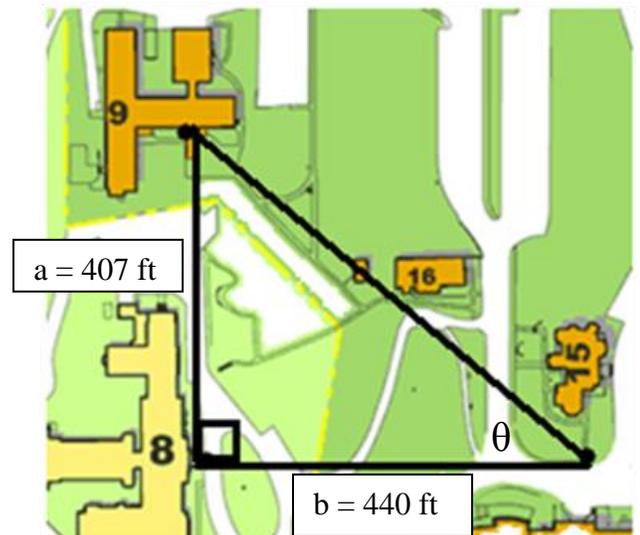
The Villa was originally a part of the Van Duzer estate. The estate was comprised of forty-eight acres along with the mansion. In 1913 the Dominican sisters purchased the estate and later, in 1955, Mount saint Mary College used the Rosenhof house when the college became an accredited junior college. The house was then renamed The Villa Madonna and is now commonly known as The Villa. The Villa remained as the primary setting for classes up until 1963 when Aquinas Hall was opened.

Problem:

1) From the south corner of the Villa sidewalk the distance to the entrance of the Dominican Sisters Building to the West is 440ft. From the entrance of the Dominican Center to the entrance of Guzman the distance is 407ft. These two distances form a right angle with one another. What is the distance between the Villa and Guzman Hall?

2) Using the information given in part A along with the distance between the south corner of the Villa and the entrance to Guzman Hall; what is the area of the campus that is enclosed in the three points given in part A?

3) Using data attained through the first two parts calculate the angle of the triangle that is located at south corner of the Villa sidewalk.



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Solution:

1) Solved Using The Pythagorean Theorem:

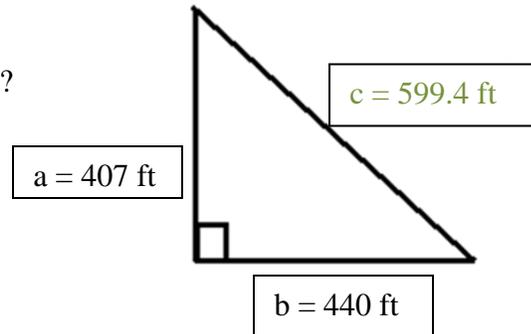
$$a^2 + b^2 = c^2 \quad a=407\text{ft} \quad b=440\text{ft} \quad c=?$$

$$407^2 + 440^2 = c^2$$

$$165649 + 193600 = c^2$$

$$c^2 = 359249$$

$$c = 599.37 \text{ ft.}$$



The distance between the south corner of the Villa sidewalk and the entrance to Guzman Hall is about 599.4 ft.

2) Using the Formula for the Area of a Triangle:

$$A = \frac{1}{2}bh \quad b = 440\text{ft} \quad h = 407\text{ft} \quad A = ?$$

$$A = \frac{1}{2}(440\text{ft})(407\text{ft})$$

$$A = 89540 \text{ ft}^2$$

The area of the campus that is enclosed in the three points is 89,540 ft².

3) Solved Using Sine or Cosine Functions:

$$\cos(\theta) = \frac{\text{Adjacent Side Length}}{\text{Hypotenuse Length}} \quad \sin(\theta) = \frac{\text{Opposite Side Length}}{\text{Hypotenuse Length}}$$

$$\cos(\theta) = \frac{440}{599.4} = 0.734$$

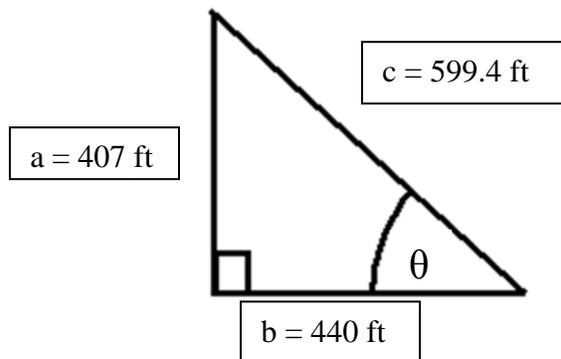
$$\theta = \arccos(0.734)$$

$$\theta = 42.8^\circ$$

$$\sin(\theta) = \frac{407}{599.4} = 0.679$$

$$\theta = \arcsin(0.679)$$

$$\theta \cong 42.8^\circ$$



The angle of the vertex that is located by the villa is approximately 42.8°.