

# Use Autograph to Solve Problems and Understand Concepts

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[www.analyzemath.com](http://www.analyzemath.com)

# What is Autograph?

- It is a graphing software with 2D and 3D capabilities.
- It has strong animation capabilities.
- It can be used to visualize topics in pre calculus, calculus and statistics.

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# Why Use Autograph in Class?

## Autograph

- enables students to visualize and further understand mathematical concepts and objects,
- has a strong capability in animating graphs and shapes and may therefore be used to explore math concepts more deeply,
- is an interactive software,
- makes students more attentive,
- can be used to create students centered environment.

# How Can Autograph be Used in Class?

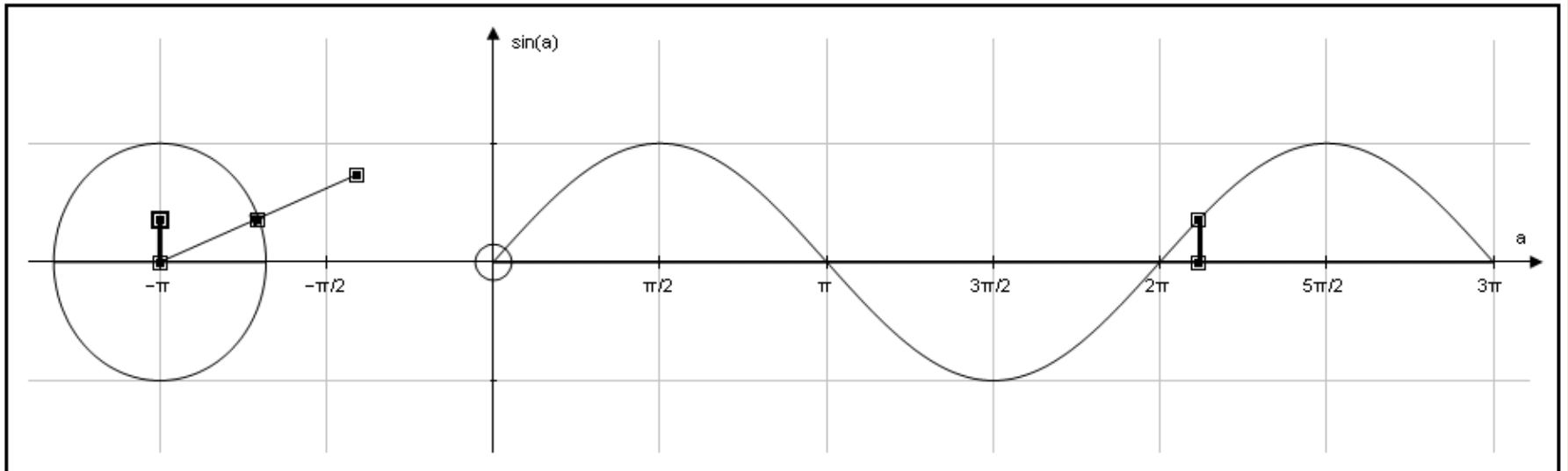
Autograph can be used to

- visualize a mathematical concept for deep understanding,
- animate a mathematical objects for more understanding,
- assist in problem solving and also to solve problems graphically and analytically,
- explore mathematical concepts and objects for deeper understanding.

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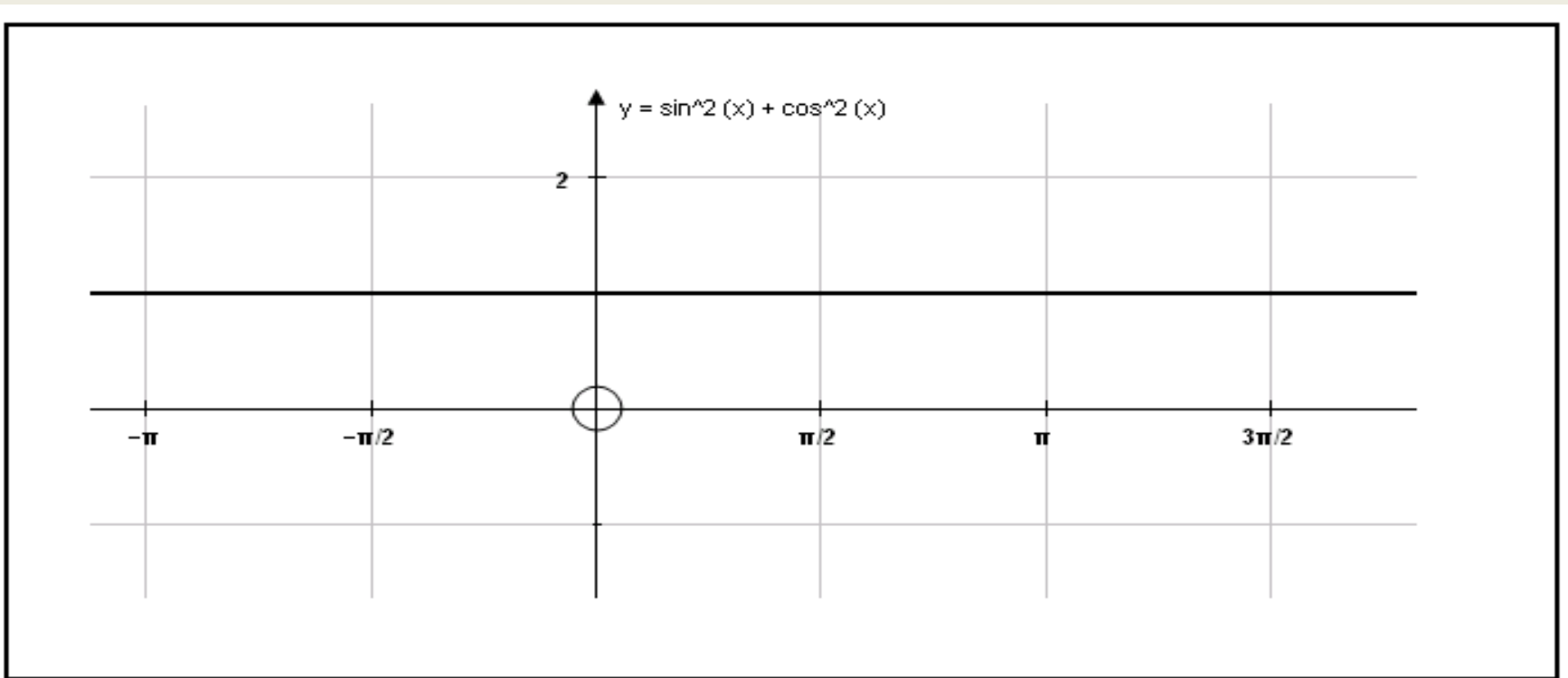
# Example 1: Unit Circle

$Y = \sin(x)$  in the unit circle and in a rectangular system of axes



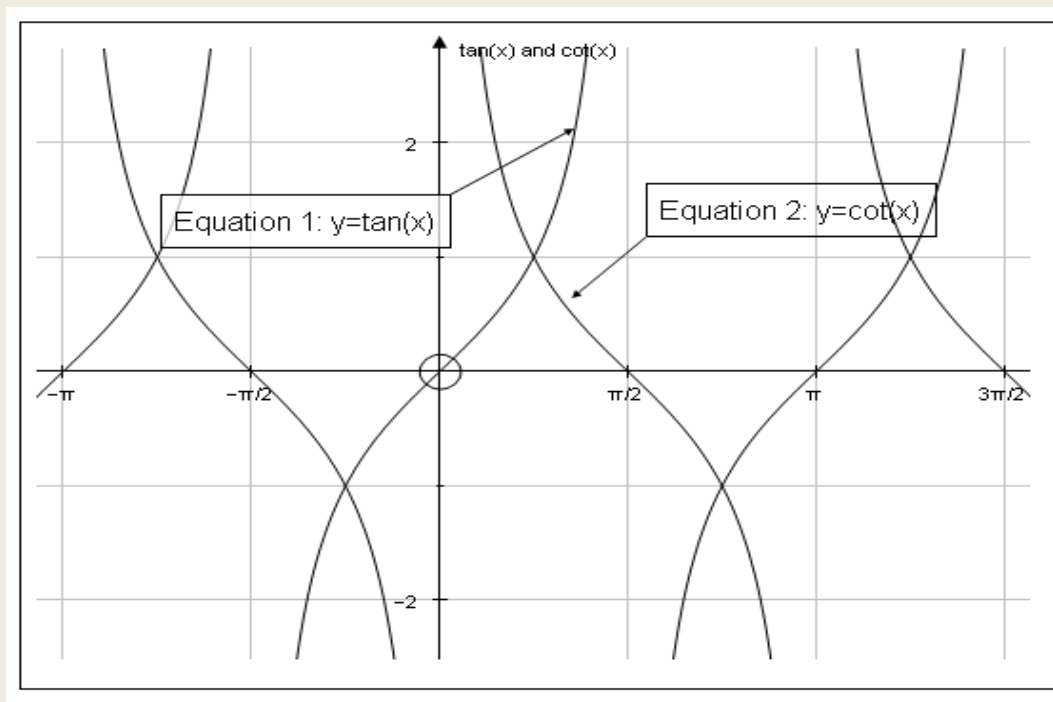
# Example 2: identity

$$\sin^2(x) + \cos^2(x) = 1$$



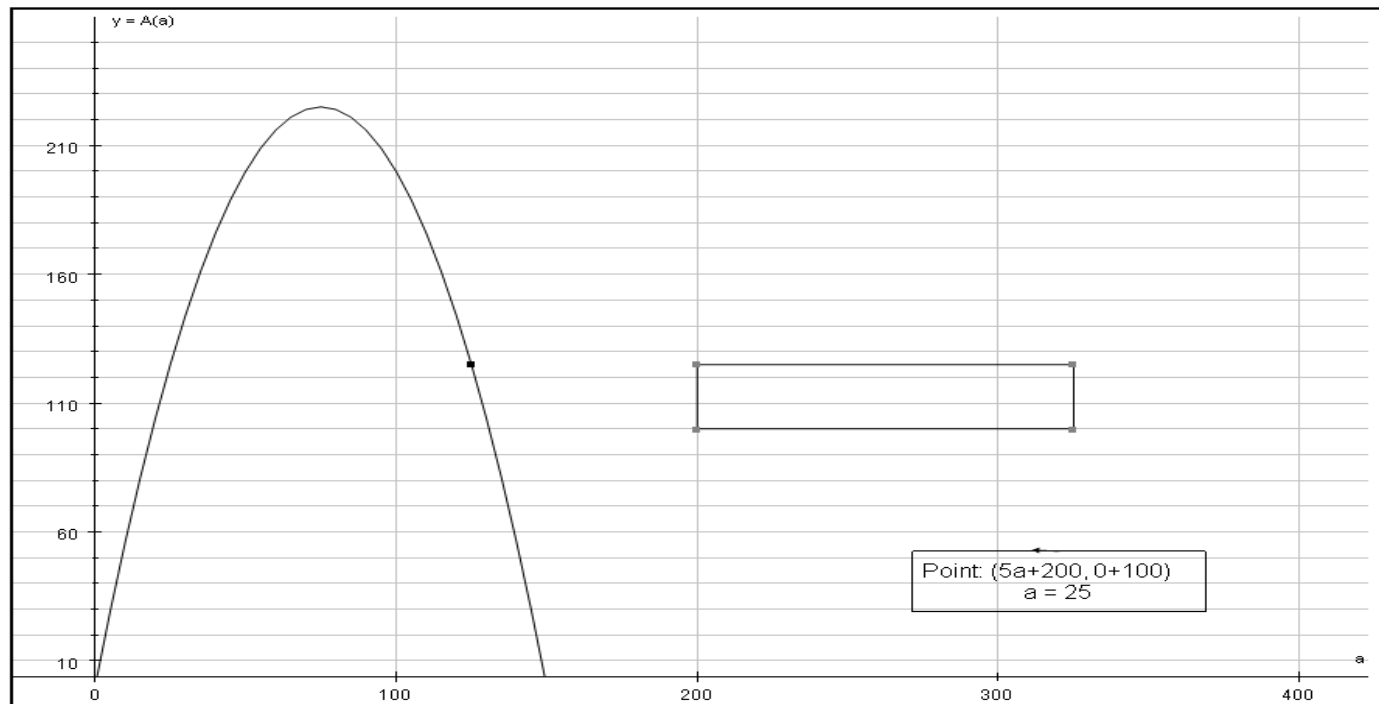
# Example 3: $\tan(x) = a \cdot \cot(x+b)$

Determine the coefficients  $a$  and  $b$  so that  $\tan(x) = a \cdot \cot(x+b)$ . Check your answer.



# Example 4: Problem Solving

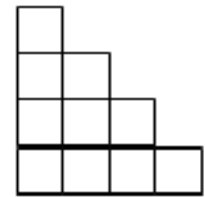
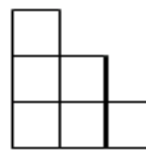
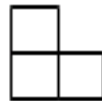
Problem: A rectangle has a constant perimeter of 60 meters. Find the length  $a$  and the width  $b$  of the rectangle so that its area has a maximum value.





# Example 5: Problem Solving

Problem: Find a function  $S$  that gives the number of squares needed to complete the pattern shown below for  $n$  rows.



$$n = 1$$

$$S(1) = 1$$

$$n = 2$$

$$S(2) = 3$$

$$n = 3$$

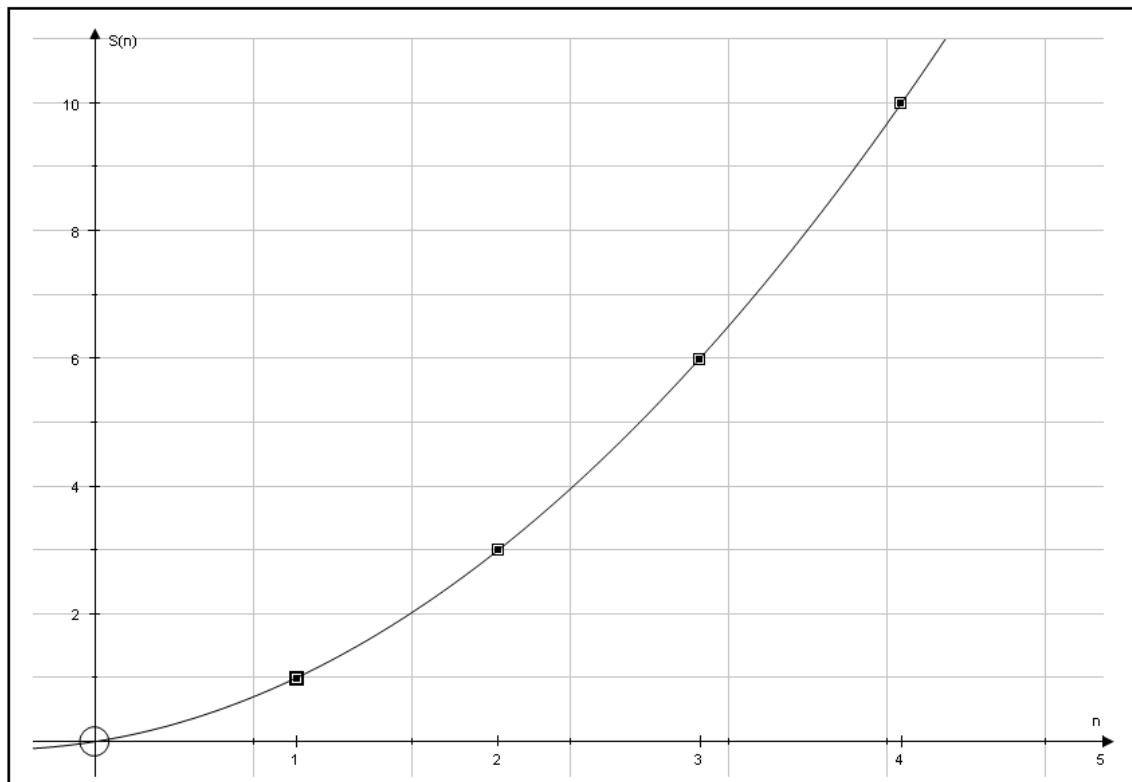
$$S(3) = 6$$

$$n = 4$$

$$S(4) = 10$$

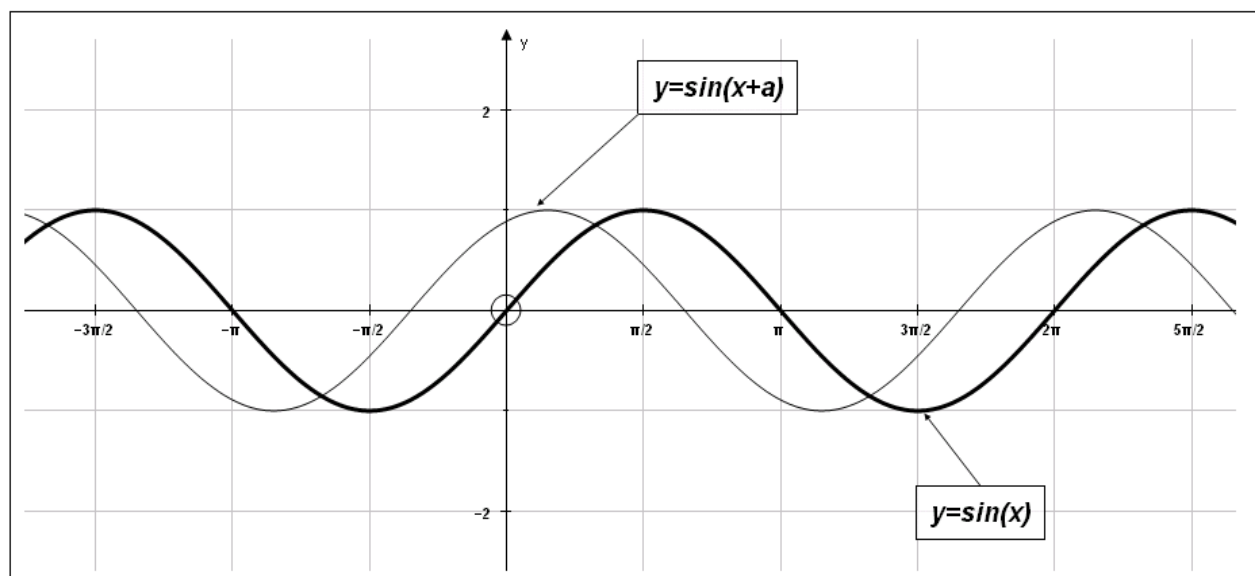
# Example 5: Continued

- Use the best fit in Autograph



# Example 5: Continued

- Explore the concept of periodicity
- Smallest positive value of constant  $a$  so that  $f(x+a) = f(x)$



# Conclusion

I have already used some of the ideas in ADM classes during the fall 2009.

- The use of Autograph motivated students.
- The use of Autograph does not necessarily require long periods of time. Some of these activities take no more than 15 minutes.
- A thorough study of the effects that Autograph has on students understanding and performance is needed.