Name _____ Date _____ Class _____

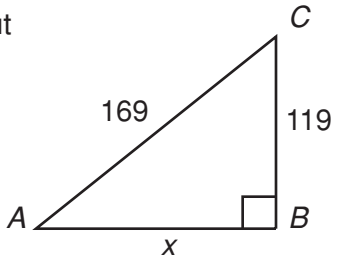
CHAPTER 8

Project

Written in Stone

Activity 1: Trigonometric Ratios in Plimpton 322 *Use after Lesson 8-2*

Plimpton 322 is a clay tablet from the Old Babylonian Empire (1900 B.C.E. to 1600 B.C.E.), located in what is now Iraq. The tablet contains columns of numbers written in the Babylonian alphabet, called *cuneiform*. These numbers, when transcribed into our modern system, tell us a lot about ancient Babylonian mathematics.



1. The table lists the numbers from the second and third columns of Plimpton 322. These numbers represent the length of a leg and the length of the hypotenuse of a right triangle. Find the length of the adjacent leg in each row.

Column II	Column III		
Opposite Leg	**Hypotenuse**	**Adjacent Leg**	tan *A*
119	169		
3367	4825		
4601	6649		
12,709	18,541		
65	97		
319	481		
2291	3541		
799	1249		
481	769		
4961	8161		
45	75		
1679	2929		
161	289		
1771	3229		
56	106		

2. Fill in the tangent ratio for each row.

3. At first glance, the numbers from the second and third columns of Plimpton 322 may appear to be random. Use what you have discovered to explain how these numbers are arranged.

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Name _____ Date _____ Class _____

CHAPTER 8

Project

Written in Stone

Activity 2: A Closer Look at Plimpton 322 *Use after Lesson 8-3*

The Babylonian tablet Plimpton 322 contains a great deal of mathematical information. In fact, many believe that the tablet provides the oldest known record of trigonometric functions.

1. The table shows the first three columns of Plimpton 322, transcribed into our modern number system. Fill in the tan A column of the table using your work from Activity 1. Then find the corresponding angle measures to the nearest tenth of a degree.

Column I	Column II	Column III	tan A	m$\angle A$
1.9834026	119	169		
1.9491583	3367	4825		
1.9188019	4601	6649		
1.8862478	12,709	18,541		
1.8150075	65	97		
1.7851928	319	481		
1.7199836	2291	3541		
1.6927093	799	1249		
1.6426693	481	769		
1.5861225	4961	8161		
1.5625	45	75		
1.4894167	1679	2929		
1.4500173	161	289		
1.4302387	1771	3229		
1.3871604	56	106		

2. What do you notice about the angle measures in the table?

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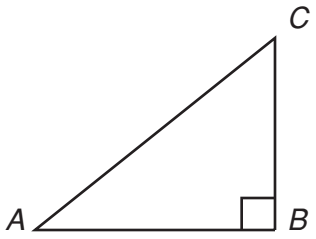
3. Given an acute angle, $\angle A$, in a right triangle, the *secant* of $\angle A$ (written sec A) is the ratio of the length of the hypotenuse to the length of the leg adjacent to $\angle A$. Also, $(\tan A)^2 + 1 = (\sec A)^2$. Use this fact to identify the values in the first column of Plimpton 322.



$$\sec A = \frac{AC}{AB}$$

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