Sine Cosine Game

by Marsha Hurwitz, Houston, Texas,
in the *Mathematics Teacher*

After I introduce my students to the sine and cosine functions, I begin a class period with the following game that has proved quite successful. First I divide the class into pairs and distribute single sheets of paper to each pair. On this sheet are two columns. The left-hand column contains expressions involving either the sine or cosine function. In the right-hand column are actual decimal approximations of the expressions in the left-hand column, but in a random order. The values are chosen such that only one of the five decimal values is plausible for each function.

At the signal from me, each pair has three minutes to match each expression in the left-hand column with its proper decimal representation in the right-hand column. Calculators are not permitted. Any pair is a winner if it obtains all five correct matchings. After I have introduced all six trigonometric functions, I play the same game but mix secant with cosine or cosecant with sine expressions in the left-hand column. The game can be made even more challenging by using more trigonometric expressions in this column. However, ambiguities are more likely to occur, so care must be taken. Students have responded very well to this exercise. It especially reinforces those skills involving deductive reasoning, graph interpretation, and approximation. Finally, students are given an opportunity to learn from, and work with, each other.

Precalculus Names: _____

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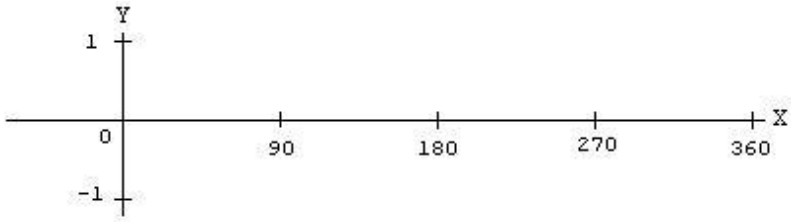
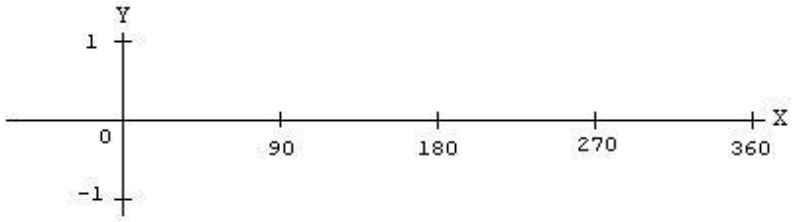
Matching #1



_____	cos 35	A. -0.9961
_____	cos 98	B. 0.8192
_____	cos 4	C. 0.0349
_____	cos 175	D. -0.1391
_____	cos 272	E. 0.9976

Matching #2



_____	sin 224	A. 0.1908
_____	sin 52	B. 0.7888
_____	sin 290	C. -0.0871
_____	sin 355	D. -0.6946
_____	sin 11	E. -0.9396

Precalculus Names: _____

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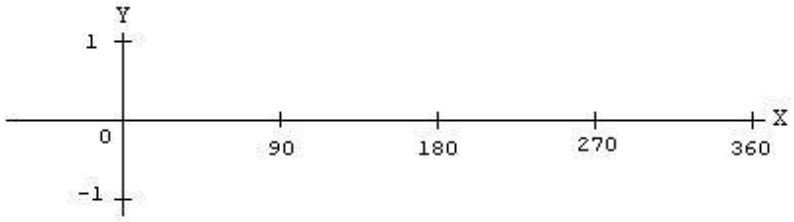
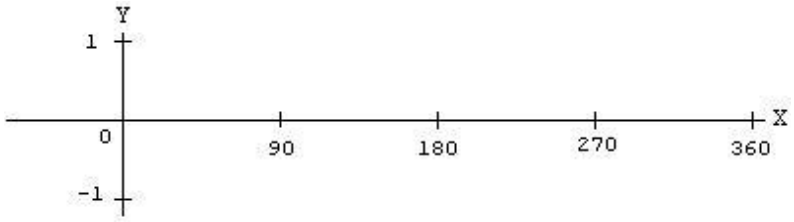
Matching #3



_____ cos 7 A. -1.2360
_____ sec 98 B. 1.0456
_____ cos 304 C. 0.5591
_____ sec 17 D. -7.1852
_____ sec 144 E. 0.9925

Matching #4



_____ csc 130 A. -28.653
_____ sin 289 B. 1.3054
_____ sin 185 C. -1.0402
_____ csc 254 D. -0.9455
_____ csc 358 E. -0.0871