Precalculus Students,

Test 4 will be Thursday and Friday April 23/24. You will take it on-line using MyMathLab. You must complete it in one session in which you will have a total of two hours. To be prepared, you should have done or should do the following:

1. Watched all the videos on Chapter 9.
   http://telstarbob.net/bbrown/math1113dailyspring2020-Revised.htm
2. Completed all the homework for Chapter 9.
3. Watch the Solving Triangles Video
   https://www.youtube.com/watch?v=-stNTubiIEo&feature=youtu.be
4. Work the practice test by yourself.
   http://telstarbob.net/bbrown/Precalculus/Test4ReviewProblemsPages.pdf
5. Watch Practice test 4 video if you need help on any problem.
   https://www.youtube.com/watch?v=Ps2oJ7OzGRE
6. Solve a number of triangle problems in which there are no right angles. It is absolutely imperative that you start with an accurately labeled diagram with all angles and sides info that you are given. You will use Law of Sines and Law of Cosines depending on the problem
7. Use Law of Sines to solve one/two triangle problems in which you determine whether there is one triangle solution or no triangle solution. Remember that after solving for an angle say B_1, determine whether there is another solution B_2, whose sine is the same. That would be $180-B_1$. Then, if B2 + the other given angle is less than 180 degrees, there are two solutions. You complete the problem by using Law of Sines to solve for the other side.
8. Solve triangle problems using Law of Cosines. Here, if you have two sides and the angle between them, you can solve for the other side. Also, if you have all sides, you can solve for all angles using the alternate version of the Law of Cosines.
9. Find the area of a triangle. If you have two sides and the included angle θ, the area is ½ the product of the two sides times sin θ. If you have all three sides, use Heron's formula.
10. Solve word problems involving triangles. Draw an accurate picture.

All of these ideas are illustrated in the Practice Test.

On the test, you may have this study guide as well as the unit circle and associated formulas at the end of this note.

Good luck,

Dr. Brown
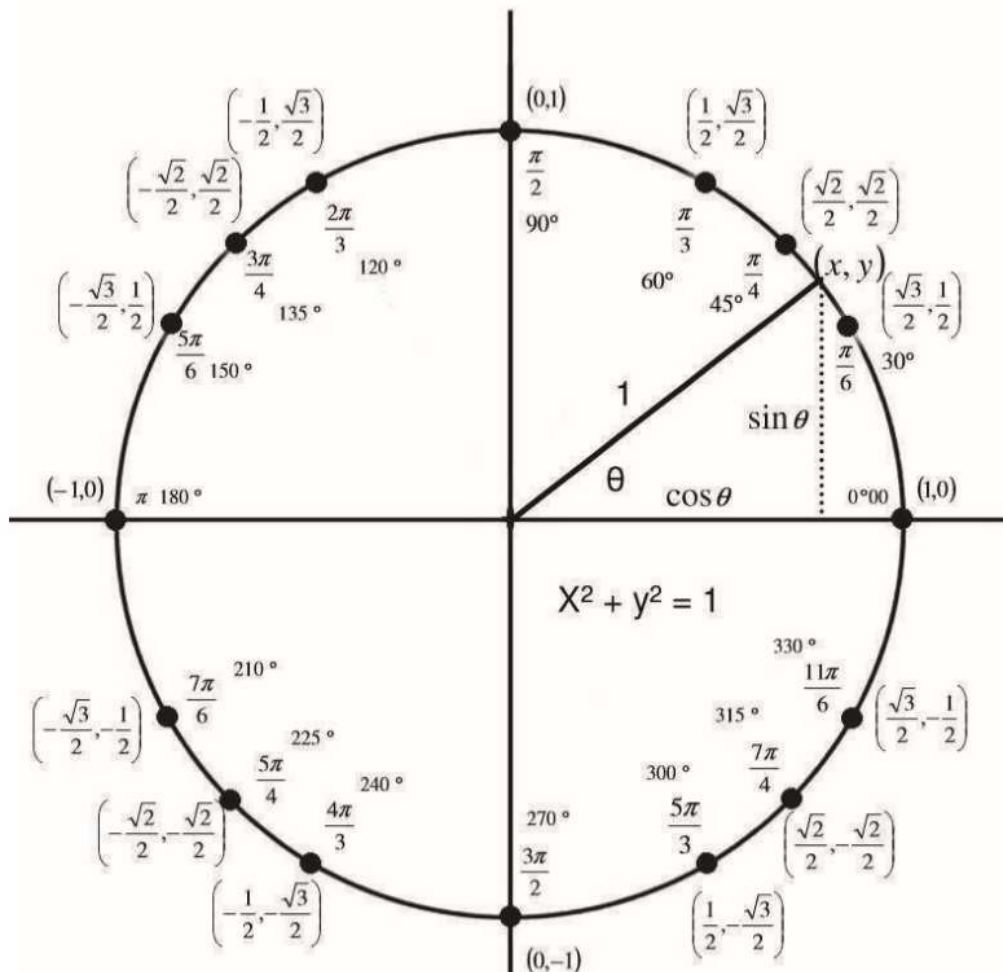
Some Identities You May Need

Reciprocal Identities

$$\sin x = \frac{1}{\csc x} \qquad \sec x = \frac{1}{\cos x} \qquad \tan x = \frac{1}{\cot x}$$

$$\csc x = \frac{1}{\sin x} \qquad \cos x = \frac{1}{\sec x} \qquad \cot x = \frac{1}{\tan x}$$

Tangent and Cotangent Identities

$$\tan x = \frac{\sin x}{\cos x} \qquad \cot x = \frac{\cos x}{\sin x}$$

Pythagorean Identities

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

$$1 + \tan^2 x = \sec^2 x \qquad 1 + \cot^2 x = \csc^2 x$$

$$s = r\theta$$

$$A = \frac{1}{2} r^2 \theta \qquad \text{Remember SOHCAHTOA}$$

$$T = \frac{2\pi}{\omega}$$

Two Sheets Allowed on Test 4 Pre-Calculus – Dr. Bob Brown

$$\frac{\sin A}{a} = \frac{\sin B}{b} \qquad \frac{\sin A}{a} = \frac{\sin C}{c} \qquad \frac{\sin B}{b} = \frac{\sin C}{c} \qquad \text{Law of Sines}$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$
$$b^2 = a^2 + c^2 - 2ac \cos B \qquad \text{Law of Cosines}$$
$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab} \qquad \text{Law of Cosines – Alternate Version}$$

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$$

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

The Area K of a Triangle is One Half the product of two sides times the sine of the angle between them

$$K = \frac{1}{2}ab \sin C$$

$$K = \frac{1}{2}bc \sin A$$

$$K = \frac{1}{2}ac \sin B$$

Heron's Formula

The area K of a triangle with sides a, b, and c is

$$K = \sqrt{s(s - a)(s - b)(s - c)} \qquad (5)$$

where $s = \frac{1}{2}(a + b + c)$.