Review Sheet for Exam 2 (Chapter 5 and Sections 6.1–6.4)

Math 1060–5

Formulas Given:

$$\sin(u + v) = \sin u \cos v + \cos u \sin v$$

$$\sin(u - v) = \sin u \cos v - \cos u \sin v$$

$$\cos(u + v) = \cos u \cos v - \sin u \sin v$$

$$\cos(u - v) = \cos u \cos v + \sin u \sin v$$

$$\tan(u + v) = \frac{\tan u + \tan v}{1 - \tan u \tan v}$$

$$\tan(u - v) = \frac{\tan u - \tan v}{1 + \tan u \tan v}$$

$$\sin 2u = 2 \sin u \cos u$$

$$\cos 2u = \cos^2 u - \sin^2 u$$

$$= 2 \cos^2 u - 1$$

$$= 1 - 2 \sin^2 u$$

$$\tan 2u = \frac{2 \tan u}{1 - \tan^2 u}$$

$$\sin \frac{u}{2} = \pm\sqrt{\frac{1 - \cos u}{2}}$$

$$\cos \frac{u}{2} = \pm\sqrt{\frac{1 + \cos u}{2}}$$

$$\tan \frac{u}{2} = \frac{1 - \cos u}{\sin u}$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

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

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

$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$\text{Area} = \frac{1}{2} bc \sin A = \frac{1}{2} ab \sin C = \frac{1}{2} ac \sin B$$

$$\|\mathbf{v}\| = \sqrt{v_1^2 + v_2^2}$$

$$\cos \theta = \frac{\mathbf{u} \cdot \mathbf{v}}{\|\mathbf{u}\| \cdot \|\mathbf{v}\|}$$

Section 5.1

- Be able to use trigonometric identities to simplify expressions.
- **Practice Problems:** 5.1 #1, 3, 5, 27-43 odds

Section 5.2

- Be able to verify trigonometric identities.
- **Practice Problems:** 5.2 #1-37 odds

Section 5.3

- Know how to solve trigonometric equations, giving all solutions when appropriate.
- **Practice Problems:** 5.3 #7-33 odds

Section 5.4

- Know how to use the sum and difference formulas for the sine, cosine, and tangent functions.
- **Practice Problems:** 5.4 #1-21 odds, 37-49 odds

Section 5.5

- Be able to use double-angle formulas.
- Know how to use the half-angle formulas, including whether the resulting value is positive or negative.
- **Practice Problems:** 5.5 #23, 25, 27, 49, 51, 53

Section 6.1

- Be able to use the Law of Sines to solve a triangle, and be able to recognize when there are two solutions or no solutions to a triangle.
- Be able to find the area of a triangle.
- **Practice Problems:** 6.1 #1, 3, 5, 13, 29, 31, 33, 43

Section 6.2

- Know how to use the Law of Cosines to solve a triangle and recognize when to use it instead of the Law of Sines.
- **Practice Problems:** 6.2 #1-9 odds, 15

Section 6.3

- Be able to find the component form and magnitude of a vector.
- Know how to sketch vectors on the coordinate plane.
- Be able to find a unit vector in the direction of a given vector.
- Be able to add and subtract vectors, as well as multiply them by scalars.
- Know how to use the standard unit vectors $\hat{\imath}$ and $\hat{\jmath}$.
- Know how to find the direction angle of a vector.
- **Practice Problems:** 6.3 #3-13 odds, 21-37 odds, 53, 55

Section 6.4

- Know how to calculate the dot product of two vectors.
- Be able to find the angle between two vectors, and be able to tell when two vectors are parallel, orthogonal, or neither.
- **Practice Problems:** 6.4 #1-37 odds