The final exam is on Wednesday March 27th (in our normal room MLC 108). You will have two hours, 6:15pm-8:15pm, to complete the exam.

You will be allowed one 3” x 5” note card (front and back) of your hand written notes. You may use a calculator during the exam, but you must SHOW ALL OF YOUR WORK to receive credit.

The final exam is comprehensive. It will cover all material we’ve seen in the course and will be comprised as follows:

- 5/6 of the exam will be from the “old” material covered in chapters 4, 5 and 6.
- 1/6 of the exam will be from the “new” material on polar coordinates and graphs covered in chapter 10.

The assigned homework from section 10.7 will be due at the beginning of the final exam on Wednesday March 27th.

Topics and Breakdown of the Exam

- **Angle Measure**
  - Know the definitions of radian and degree measure.
  - Sketch angles in standard position and convert between radian and degree measure.
  - Find coterminal angles and reference angles.
  - Know the formulas for arclength, area of a sector of a circle and the relationship between angular speed and linear speed. Solve applied problems involving these concepts. (You may need to convert between units of measure.)

- **Trig. Functions, Inverse Trig. Functions and Their Graphs**
  - Know the definitions of the six trig. functions from all three perspectives: right triangles, on the unit circle and on any circle of radius $r$ centered at the origin.
  - Know the period of each of the six trig. functions.
  - Know the unit circle.
  - Know the domain and range of each of the six. trig functions. Find the amplitude, period, phase shift and vertical shift and graph two cycles of a sine, cosine, tangent or cotangent function. (You will need to plot the key points.)
  - Graph a secant or cosecant function from the graph of the corresponding cosine or sine function.
  - Know the basic properties (domain, range, graph and key relationship with corresponding trig. function) of the inverse trig. functions arcsine, arccosine and arctangent.
  - Find the exact values of various expressions involving trig. functions, inverse trig. functions and their compositions.
• Triangles
  – Solve right triangles and oblique triangles.
  – Know the concept of directional bearing.
  – Solve applied problems involving right and/or oblique triangles. (I will supply the diagrams.)

• Verifying Trig. Expressions, Solving Trig. Equations and Applying Trig. Identities
  – Know the identities: reciprocal, quotient, Pythagorean, even/odd, cofunction, sum-difference, double-angle, half-angle and power-reducing. (You will not be asked to use the product-to-sum formulas or sum-to-product formulas.)
  – Verify trigonometric identities.
  – Solve trigonometric equations. (Find all solutions and solutions on a restricted interval.)
  – Apply trigonometric identities to evaluate trigonometric functions.

• Vectors
  – Determine if two vectors are equivalent and find the component form and the magnitude of a vector.
  – Sketch vectors in standard position.
  – Find the unit vector in the direction of a given vector and compute the direction angle of a vector.
  – Write a vector as linear combination of \( \hat{i} \) and \( \hat{j} \).
  – Combine the operations of vector addition, scalar multiplication and dot product.
  – Find the angle between vectors and determine if two vectors are orthogonal.
  – Compute the projection of one vector onto another vector.
  – Solve applied problems involving vectors. (If necessary a diagram will be provided.)

• Polar Coordinates, Polar Equations and Polar Graphs
  – Plot points in polar coordinates. (Polar graph paper will be supplied.)
  – Find multiple representations of the same point in polar coordinates.
  – Convert between polar and rectangular coordinates.
  – Convert equations between polar and rectangular form.
  – Graph equations of lines and circles in polar form. (Polar graph paper will be supplied.)
Practice Problems

• Angle Measure
  - p. 270/271: 60, 71, 72
  - p. 297: 45, 48
  - p. 345: 1, 2, 3

• Trig. Functions, Inverse Trig. Functions and Their Graphs
  - p. 277: 8, 11, 25 41
  - p. 286/287: 10, 12, 13, 17,63
  - p. 296/297: 9, 21, 35, 71
  - p. 206/307: 1, 8, 33, 53, 54, 83
  - p. 317: 9-14, 16, 27, 34, 35
  - p. 326/327: 5, 14, 39, 43, 52, 58, 66

• Triangles
  - p.336/337/338: 19, 22, 24, 25, 27, 35, 37, 42
  - p. 408/409: 17, 47, 52
  - p.415/416: 31, 34, 36, 47, 51

• Verifying Trig. Expressions, Solving Trig. Equations and Applying Trig. Identities
  - p. 355: 7, 10, 14
  - p. 362: 15, 24, 28, 31, 33, 38
  - p. 371: 14, 18, 25, 35, 41, 43
  - p: 379: 8, 13, 22, 35, 42
  - p. 389: 7, 22, 35, 38

• Vectors
  - p. 427/428/429: 12, 20, 36, 44, 50, 74, 81, 86, 91
  - p. 437/438: 8, 34, 49, 56, 59, 67

• Polar Coordinates, Polar Equations and Polar Graphs