

The Final Exam consists of **22 multiple-choice questions** and **10 long-answer and graphing** problems.

**Multiple-choice** problems can be done in a few steps. Some examples are:

1. Find the exact value in radians:  $\sin^{-1}\left(\frac{1}{2}\right)$
2. If  $\sin\theta > 0$  and  $\tan\theta < 0$ , in what quadrant does  $\theta$  terminate?
3. Determine the period (or domain, range, amplitude, phase shift) of the function  $y = -4\sin(3x + \pi)$

Other examples could include questions on fundamental identities, the unit circle, triangle notation, vector notation

For the **long-answer** and **graphing** problems, work must be shown and complete solutions given. Some examples are:

1. Sketch the graph of the function  $y = 3\cos 2x$  over a two-period interval. Identify the domain, range, amplitude, period, and phase shift. Identify any maximum/minimum point(s) and x-intercept(s).
2. Find all exact real solutions, in radians:  $\sin 4x + 2 = 3$
3. Verify the identity:  $\tan x + \cot x = \sec x \csc x$

In general, expect

- 2 - 3 graphs: 1 sine, 1 cosine, 1 other
- 1 - 2 identities to verify
- 1 - 2 trig equations to solve
- 1 - 2 Right triangle applications
- 1 Law of Sines/Law of Cosines application
- 1 - 2 Vector questions

The final exam will cover the sections from the eBook which are listed. A sampling of exercises from the chapter reviews and chapter tests is included for practice. (In our EWA course, choose eBook, then Chapter 1 (or 2 or 3). The Review Exercises and Chapter Test are listed there. Answers can be found starting on p. A-25 in the eBook.)

### Chapter 1: Trigonometry - Sections 1.1 – 1.8

#### Important:

- Know how to find coterminal angles; convert from radians to degrees and back; arc length; definitions of Trig functions
- Know the unit circle
- Be able to graph Trig functions and transformations without a calculator
- Given the graph, be able to write the equation for a Trig function
- Know the domains and ranges for  $f(x) = \sin^{-1}(x)$ ,  $f(x) = \cos^{-1}(x)$ ,  $f(x) = \tan^{-1}(x)$
- Know how to solve applications involving right triangles

#### p. 202 – Chapter 1 Review

1, 9, 15, 19, 23, 27, 33, 39, 43, 49, 53, 56, 63, 67, 71, 77, 78, 87, 91, 93, 95, 97, 98

#### p. 205 – Chapter 1 Test

1, 4 – 13, 16, 17

### Chapter 2: Analytic Trigonometry - Sections 2.1 – 2.5

#### Important:

- Know the identities: Fundamental (p. 210), Sum & Difference (p. 236)
- Be able to use the identities (provided): Double-Angle, Power-Reducing, Half-Angle, Product-to-Sum, Sum-to-Product
- Use identities listed to simplify expressions, evaluate expressions, verify identities, and solve equations, both all solutions and solutions in  $[0, 2\pi)$ .

#### p. 253 – Chapter 2 Review

7, 10, 13, 17, 20, 23, 27, 33, 34, 38, 41, 43, 49, 51, 53, 57, 62, 63, 70, 72, 75, 77, 81, 82

#### p. 255 – Chapter 2 Test

1 – 4, 7 – 10, 14 – 20, 23, 24

### Chapter 3: Additional Topics in Trigonometry - Sections 3.1 – 3.3

#### Important:

- Know the equations for the Law of Sines (p. 262) and Law of Cosines (p. 271); use them to solve oblique triangles
- Know vector notation, component form, linear combination of **i** and **j**
- Be able to perform operations with vectors; find resultant, magnitude and direction angle

#### p. 302 – Chapter 3 Review

1 – 19 odd, 21 – 37 odd, 38, 39, 43 – 75 odd, 107, 108

#### p. 306 – Chapter 3 Test

1 - 16

Here are some "sample" multiple-choice questions, along with the review sheet reference problem in ( ).

1. (Ch 1 Review, #1) Name a positive angle and a negative angle that are coterminal with  $\theta = \frac{13\pi}{5}$

- A)  $\frac{3\pi}{5}, -\frac{7\pi}{5}$       B)  $\frac{23\pi}{5}, -\frac{14\pi}{5}$       C)  $\frac{\pi}{5}, -\frac{17\pi}{5}$       D) All of these

2. (Ch 1 Review, #27) Determine the exact value of  $\cos\left(\frac{11\pi}{4}\right)$

- A)  $-\frac{\sqrt{3}}{2}$       B)  $\frac{\sqrt{3}}{2}$       C)  $\frac{\sqrt{2}}{2}$       D)  $-\frac{\sqrt{2}}{2}$

3. (Ch 1 Review, #49) Given that  $\sin \alpha = -\frac{5}{13}$  and  $\alpha$ 's terminal side is in quadrant III, determine the exact value of  $\cos \alpha$ .

- A)  $\frac{12}{13}$       B)  $\frac{8}{13}$       C)  $-\frac{12}{13}$       D)  $-\frac{8}{13}$

4. (Ch 1 Review, #87) . Find the exact value of  $\tan\left(\sin^{-1}\frac{4}{5}\right)$

- A)  $\frac{3}{4}$       B)  $\frac{4}{3}$       C)  $\frac{3}{5}$       D)  $\frac{5}{3}$

5. (Ch 1 Review, #12) Which of the following is the equation of the sine graph with amplitude 2 and period  $\pi$ ?

- A)  $y = 2\sin(x - \pi)$       B)  $y = \frac{1}{2}\sin(4x)$       C)  $y = 2\sin(\pi x)$       D)  $y = 2\sin(2x)$

6. (Ch 2 Review, #51) Find the exact value of  $\cos\left(\frac{11\pi}{16}\right)\cos\left(\frac{7\pi}{16}\right) + \sin\left(\frac{11\pi}{16}\right)\sin\left(\frac{7\pi}{16}\right)$

- A)  $\frac{\sqrt{3}}{2}$       B)  $\frac{1}{2}$       C)  $\frac{\sqrt{2}}{2}$       D) 1

7. (Ch 3 Review, #71) Find the magnitude of vector  $\mathbf{t} = \langle -3, 4 \rangle$

- A) 25      B) 5      C) 1      D) 7