Section 7.2 Learning Objectives:

- Video 1: The Sum and Difference Identities (7:38)

    - State the sum and difference identities for the sine and cosine functions.
    - Determine the exact values of trigonometric functions of certain angles beyond the common angles of the unit circle using the sum and difference identities.
    - Determine the value of expressions using the sum and difference identities.

- Video 2: Applications of the Sum and Difference Identities (8:18)

    - Determine the solutions of equations using the sum and difference identities.
    - Prove identities using the sum and difference identities.

- Video 3: Sums of Sinusoidals (6:57)

    - Convert the sum of sinusoidal functions with the same period into a single sinusoidal function.

- Video 4: More Identities (4:08)

    - Determine the value of expressions using the sum-to-product and product-to-sum identities.

Individual Learning Objective Binder Check: Before class, you should have completed the Learning Objective Worksheet for each of the learning objectives in the video. These should have been placed in a binder in an organized manner so that it can be quickly checked by the instructor. If you have specific questions, this is a good time to ask the professor about them. While you are waiting for the professor to make their way around the room, you can work on the rest of the activities.

Group Practice Problems: In a group of no more than 3 students, work on the following problems. While everyone in the group should work together, each student should write out their work for themselves. This work can prove to be helpful when working on the homework assignment. If questions arise as you're working on these problems, feel free to seek help from the instructor or other groups of students.

Group Practice Problems #1 - Values of Trigonometric Functions: Determine the exact values of the following trigonometric functions.

- $\sin(75°)$

- $\cos(105°)$

- $\sin\left(\frac{11\pi}{12}\right)$

Group Practice Problems #2 - Identifying Expressions: Use either a sum or difference identity to rewrite the given expression in terms of a single sinusoidal function.

- $\sin(4t)\cos(2t) + \sin(2t)\cos(4t)$

- $\cos(11x)\cos(3x) - \sin(11x)\sin(3x)$

Group Practice Problems #3 - Tangent Identity: Prove the following sum of angles identity for tangent using the sum and difference identities for the sine and cosine functions.

- $\tan(\alpha + \beta) = \frac{\tan(\alpha)+\tan(\beta)}{1-\tan(\alpha)\tan(\beta)}$

Group Practice Problems #4 - Solving Equations: Solve the equation. Describe your steps and state any identities that you use.

- $\sin(3x)\sin(2x) - \cos(3x)\cos(2x) = \frac{\sqrt{2}}{2}$

Group Practice Problems #5 - Rewriting a Sum of Sinusoidals: Rewrite the expression in the form $A\sin(Bx + C)$.

- $-8\sin(3x) + 8\sqrt{3}\cos(3x)$

- $2\sin(4x) - 2\cos(4x)$

Group Practice Problems #6 - Proving Identities: Prove the following identities. Describe the steps and state any identities that you use.

- $\sin(\alpha)\cos(\beta) = \frac{1}{2}\left(\sin(\alpha + \beta) + \sin(\alpha - \beta)\right)$

- $\cos(\alpha)\cos(\beta) = \frac{1}{2}\left(\cos(\alpha + \beta) + \cos(\alpha - \beta)\right)$

Group Practice Problems #7 - Combinations of Sinusoidals: Evaluate the expression using a sum-to-product identity.

- $\cos(15°) - \cos(75°)$

- $\sin(15°) - \sin(105°)$

Group Work Check: Present your work for the practice problems to the instructor for approval. The work will not be graded deeply, but simply graded on whether it appears that you have put in a good faith effort to do the work. If you are not confident about particular problems, this is a good time to ask about them.

Section 7.2 Homework:

- 7.2 (General Problems): #1, 5, 9, 17, 21, 27, 29, 45, 49

- 7.2 (Write-Up): #39 (Hint: Write it as a single sinusoidal function), 55