Homework Section 6.2
Precalculus

1. Show that the followings are not identities

$$\begin{aligned} \cos(x-y) &= \cos x - \cos y \\ \tan(x+y) &= \tan x + \tan y \end{aligned}$$

2. Write $\cos 3x \cos 2x - \sin 3x \sin 2x$ as a single cosine

3. Verify that

$$\cot\left(\frac{\pi}{2} - x\right) = \tan x$$

4. Show that $\cos(90\deg - A) = \sin A$

5. Find the exact value of $\cos\left(\frac{\pi}{12}\right)\sin\left(\frac{\pi}{12}\right)$

6. If $\sin\alpha = \frac{3}{5}$ with α in the first quadrant, and $\cos\beta = -\frac{5}{13}$ in the 3rd quadrant, compute

   a. $\sin(\alpha+\beta)$
   b. $\cos(\alpha+\beta)$
   c. $\tan(\alpha+\beta)$

7. Without the use of a calculator, evaluate

$$\sin\left(\arccos\left(-\frac{4}{5}\right) + \arcsin\left(-\frac{3}{5}\right)\right)$$

8. Without the use of a calculator, evaluate

$$\cos\left(\arccos\left(-\frac{\sqrt{3}}{2}\right) - \arcsin\left(-\frac{1}{2}\right)\right)$$

9. Verify that

$$\frac{\cos(x+h)-\cos x}{h} = \cos x\left(\frac{\cos h - 1}{h}\right) - \sin x\left(\frac{\sin h - 1}{h}\right)$$

10. If $\tan(\alpha+\beta) = 3$ and $\tan\beta = \frac{1}{2}$, find $\tan\alpha$

11. Prove the trig identity

$$\sin\left(\frac{\pi}{4} + x\right) + \sin\left(\frac{\pi}{4} - x\right) = \sqrt{2}\cos x$$

12. Given the function $f(x) = -\cos x$ and $g(x) = \sin\left(\frac{\pi}{2} + x\right)$

    (a) Plot the graph of f and g in the same cartesian plane
    (b) What is your conclusion? Can you explain why?