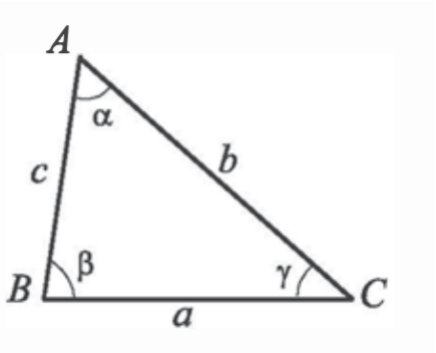
Math 418: Worksheet 12

December 6, 2020

Focus on the first 8 Problems.

1. Joe is working on a problem involving the triangle below. Joe has been told that $\beta = \frac{\pi}{2}, \sin\alpha = \frac{3}{10}$ and $b = 3$. Joe says that $a = 3$. Is Joe correct? If so show work to explain how Joe arrived at his answer. If Joe is incorrect find the correct value for a.



2. Show that the following identity holds for all θ: $(\sin(\theta) + \cos(\theta))^2 = 1 + \sin(2\theta)$.
3. Evaluate $\cos\left(\frac{5\pi}{4} - \frac{7\pi}{3}\right)$.
4. Evaluate $\sin\left(\frac{-\pi}{12}\right)$ two different ways:
   a) Use the fact that $\frac{-\pi}{12} = \frac{1}{2}\left(\frac{-\pi}{6}\right)$ to evaluate it.
   b) Use the fact that $\frac{-\pi}{12} = \frac{3\pi}{4} - \frac{5\pi}{6}$ to evaluate it.
5. Is $f(\theta) = 3\sin^2(\theta) + \csc(\theta)$ an odd function? An even function? Neither? Justify your answer.
6. Evaluate $\tan\left(\frac{\pi}{8}\right)$.
7. Suppose $\cos\alpha = \frac{-1}{10}$ and $2\pi \leq \alpha \leq 3\pi$. Evaluate:
   a) $\sin(\alpha)$
   b) $\sin(2\alpha)$
   c) $\cos(2\alpha)$
   d) $\cos\left(\frac{\alpha}{2}\right)$
   e) $\cos\left(\frac{3\alpha}{2}\right)$
8. Evaluate $\sin\left(\frac{-\pi}{24}\right)$