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MHF4U1 - UNIT 7 – TRIGONOMETRIC IDENTITIES AND EQUATIONS**TEST**

- 1) Using **trigonometric identities**, determine the exact value of each of the following. **SHOW ALL WORK.** Rationalize the denominators of your final answers. (*K – 3 marks each*)

a) $\sin\left(\frac{-7\pi}{12}\right)$

b) $\cos(67.5^\circ)$

- 2) Given that $\sin a = \frac{4}{5}$, $0 \leq a \leq \frac{\pi}{2}$ and $\tan b = -\frac{12}{5}$, $\frac{\pi}{2} \leq b \leq \pi$, determine the value of $\cos(a - b)$.

(K – 3 marks)

- 3) Determine the **exact** value of $\cos\left(\frac{5\pi}{6} - \frac{5\pi}{4}\right)$. Rationalize the denominator of your answer. (*K – 3 marks*)

4) Determine the solutions for each equation on the interval $0 \leq x \leq 2\pi$. Give exact solutions, where possible. Round approximate solutions to the nearest tenth of a radian. (*4 – 3 marks each*)

a) $\sqrt{2} \cos x + 1 = 0$

b) $2 \sin^2 x - 1 = 0$

c) $3(2 \cos 2x + 4) = 10$

d) $2 \sin x \tan x = \tan x$

5) Prove the following identities. (*I – 4 marks each*)

a) $(\sin x + \cos x)(\tan x + \cot x) = \sec x + \csc x$

b) $\frac{1 - \cos 2x + \sin 2x}{1 + \cos 2x + \sin 2x} = \tan x$

6) Solve $\sin^2 x - 5 \cos x = 3$, $0 \leq x \leq 360^\circ$. Round your final answers to the nearest degree. (*I - 4 marks*)

7) Simplify the expression $\sin(2\pi - x) + \tan\left(\frac{3\pi}{2} + x\right) - \cos\left(\frac{\pi}{2} - x\right) + \cot(\pi - x)$ as much as possible.
(*C - 3 marks*)

8) Derive the tan addition formula. **Do not** start your derivation with the tan subtraction formula.
(*C - 3 marks*)



MERRY CHRISTMAS!