Name: School:

2016 Math Field Day Trigonometry (Open)

State the exact answer for each problem. Do **NOT** use decimal approximations for π, $\sqrt{2}$, $\sqrt{3}$, for example. Radicals much be in simplest radical form and fractions in simplest form, or lowest terms. If there are multiple solutions, separate them by a comma. If there is no solution, write 'NONE'.

1. _____ Given $\tan\theta = 2$ and $\sin\theta < 0$, find the exact value of $\sec\theta$.

2. _____ The circle with center O has radius 2 in and the angle which sector AOB subtends is $60°$. Find the area of sector AOB.

3. _____ Solve $\sin x + \cos x \cot x = -\sqrt{2}$ in the interval $[0, 2\pi)$. Write your answer in radian measure.

4. _____ Rewrite the angle $\left(\frac{\pi}{4}\right)^\circ$ in radian measure.

5. _____ Given $\cot x = \pi$, find the exact value of $\sin(2x)$.

6. _____ A triangle ABC has sides $AC = \sqrt{3}$ and $AB = 1$. Angle C is $30°$. Find the length of side BC.

7. _____ Find the exact value of $\cos\left(\frac{7\pi}{12}\right)$.

8. _____ Simplify $\tan x(\csc x - \sin x)$.

9. _____ Find the exact value of $\sin\left(\sin^{-1}\left(-\frac{\pi}{4}\right) + \cos^{-1}\left(-\frac{\pi}{4}\right)\right)$.