Problem 1. [5 points] Find all solutions on $[0, 2\pi)$ for
\[
\cot x \cos^2 x = 2 \cot x
\]
\[
\cot x \cos^2 x - 2 \cot x = 0
\]
\[
\cot x \left( \cos^2 x - 2 \right) = 0
\]
\[
\cot x = 0 \quad \text{or} \quad \cos x = \pm \sqrt{2}
\]
\[
\frac{\pi}{2}, \frac{3\pi}{2}
\]
\[
\chi = \frac{\pi}{2}, \frac{3\pi}{2}
\]

Problem 2. [5 points] Find the general solution to
\[
2 \sin^2 x - 3 \cos x = 3
\]
\[
2 - 2 \cos^2 x - 3 \cos x = 3
\]
\[
0 = 2 \cos^2 x + 3 \cos x + 1
\]
\[
0 = (2 \cos x + 1)(\cos x + 1)
\]
\[
\cos x = -\frac{1}{2} \quad \text{or} \quad \cos x = -1
\]
\[
\frac{2\pi}{3}, \frac{4\pi}{3}, \pi
\]
\[
\chi = \frac{2\pi}{3} + 2\pi n, \frac{4\pi}{3} + 2\pi n, \pi + 2\pi n
\]
Problem 3. [5 points] Find all solutions on \([0, 2\pi]\) for:

\[3 \tan(2x) + 3 = 0\]

\[\tan(2x) = -1\]

\[2x = \frac{3\pi}{4} + \pi n\]

\[x = \frac{3\pi}{8} + \frac{\pi}{2} n\]

\[x = \frac{3\pi}{8}, \frac{7\pi}{8}, \frac{11\pi}{8}, \frac{15\pi}{8}\]