Please show your work, circle your answer, and leave all numbers as fractions. No calculators are allowed.

1) Simplify $(\cos(x) - 1)(\cos(x) + 1)$ by expanding it into a sum of terms. (5 points)

2) Find the number below by expressing it as a single reduced fraction. (5 points)

\[
\frac{\frac{1}{2} + \frac{5}{7}}{\frac{1}{2}} = \frac{\frac{1}{2} + \frac{5}{7}}{\frac{1}{2}}
\]

3) Verify the identity below. (10 points)

\[
\cos(x) \tan(x) = \sin(x)
\]
4) Find \( \sin(240^\circ) \). (5 points)

5) Find the number below by expressing it as a single reduced fraction. (5 points)

\[
\frac{1}{3} \quad \frac{3}{6}
\]

6) Verify the identity below. (10 points)

\[
\tan(x) + \cot(x) = \sec(x) \csc(x)
\]
7) Use the triangle given here to find $\sin(24.6^\circ)$. (10 points)

8) Verify the identity below. (10 points)

$$\sin^3(x) \csc(x) + \cos^3(x) \sec(x) = 1$$
9) Find $\sin(15^\circ)$. (5 points)

10) Find $\cos(285^\circ)$. (5 points)

11) Find $\tan\left(\frac{7\pi}{12}\right)$. (5 points)

12) Find $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$. (5 points)
13) Solve the equation below for $x$. (10 points)
\[
\cos(x) = \frac{\sqrt{3}}{2}
\]

14) Solve the equation below for $x$. (10 points)
\[
(sin(x) - 1)(2 \sin(x) + 1) = 0
\]