Let \( f(x) = \sin^2 x - \cos x \) on \([0, 2\pi]\)

a) Differentiate \( f \).

b) Simplify \( f' \).

c) Find all \( x \) with \( f'(x) = 0 \).

\[ a) \quad y' = 2(\sin x)^{2-1} \cdot (\sin x)' - (\cos x)' \]
\[ = 2\sin x \cos x - \sin x \]

b) \[ y' = \sin x (2\cos x + 1) \]

c) \( y' = 0 \) when \( \sin x = 0 \) at \( 0, \pi, 2\pi \)

When \( 2\cos x + 1 = 0 \) or \( \cos x = -\frac{1}{2} \)

90°-30°

Right)

\[ \frac{\pi}{2} - \frac{\pi}{6} = \frac{4\pi}{6} = \frac{2\pi}{3} \]

\[ \frac{3\pi}{2} - \frac{\pi}{6} = \frac{3\pi}{6} = \frac{4\pi}{3} \]

\[ y' = 0 \] when \( x = 0, \pi, 2\pi, \frac{2\pi}{3}, \frac{4\pi}{3} \)
Let \( f(x) = \cos^2 x - \sin x \) on \([0, 2\pi]\)

a) Differentiate \( f \).

b) Simplify \( f'' \).

c) Find all \( x \) with \( f'(x) = 0 \).

\[ y' = 2(\cos x)^{\frac{1}{2}}(\cos x)' - (\sin x)' \]

\[ = 2 \cos x (-\sin x) - \cos x \]

\[ = -\cos x \left[ 2 \sin x + 1 \right] \]

\[ y' = 0 \text{ when } \cos x = 0 \]

\[ x = \frac{\pi}{2}, \frac{3\pi}{2} \]

\[ y' = 0 \text{ when } 2 \sin x + 1 = 0 \]

\[ \sin x = -\frac{1}{2} \]

Vertical \( x \)-axis \( -\frac{\pi}{6}, \frac{5\pi}{6} \)

\[ \frac{\pi + \frac{\pi}{6}}{6} = \frac{7\pi}{6} \]

\[ 2\pi - \frac{\pi}{6} = \frac{11\pi}{6} \]

\[ y' = 0 \text{ when } x = \frac{\pi}{2}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6} \]