

1. Evaluate. Show at least one step before writing your answer.

a) $\lim_{x \rightarrow 0} \frac{\sin x}{\pi x}$

b) $\lim_{x \rightarrow 0} \frac{\sin^2 3x}{x}$

c) $\lim_{x \rightarrow 0} \frac{\sin(\pi - x)}{x}$

2. Differentiate with respect to x .

a) $y = 2x^4 \csc x$

b) $\cos y = \cos 2x$

3. Find the local maximum and minimum values for $f(x) = \frac{\sqrt{3}}{2}x + \cos x$, $[0, 2\pi]$. Justify using regions of increase and decrease or the second derivative test.