

1. Find the absolute maximum and minimum value of the function in the given interval.

a)  $f(x) = 2x^3 - 3x^2 - 12x + 1$       $[-2, 3]$

b)  $f(x) = xe^{-3x}$       $[-1, 2]$

c)  $f(x) = \sin 2x - \cos 2x$       $[0, \pi]$

2. Complete the following limits. If the limit does not exist, explain why.

a)  $\lim_{x \rightarrow 3} \frac{x^2 + x - 12}{x^2 + 4x - 21}$

b)  $\lim_{x \rightarrow \infty} \frac{x^3 + 3x^2 + 1}{7x^3 + x - 4}$

c)  $\lim_{x \rightarrow 1} \frac{2 - x}{(1 - x)^2}$

d)  $\lim_{x \rightarrow 0} \frac{\sin 3x}{\tan 5x}$