



Homework:

Practice

Use the fact that $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$ to find the following limits.

1. $\lim_{x \rightarrow 0} \frac{\sin(5x)}{x}$

2. $\lim_{x \rightarrow 0} \frac{\tan x}{x}$

3. $\lim_{x \rightarrow 0} \frac{\sin(6x)}{\sin(2x)}$

4. $\lim_{x \rightarrow 0} \frac{x \csc x + 1}{x \csc x}$

Find each limit or state that the limit does not exist.

1. $\lim_{x \rightarrow 1} \frac{x}{\ln x}$

2. $\lim_{x \rightarrow 3} f(x)$ given $f(x) = \begin{cases} \ln x & 1 \leq x < 3 \\ x \ln x & x \geq 3 \end{cases}$

3. $\lim_{x \rightarrow 0} \frac{e^x}{\cos x}$

4. $\lim_{x \rightarrow e} (x \ln x - x)$



Calculus 1.4: Limits of Transcendental Functions - Day 2

Practice

5. $\lim_{x \rightarrow 0} e^{\sin x}$

6. $\lim_{x \rightarrow 0} \ln(e^{x+1})$

7. Which of the following functions are continuous at $x = 1$?

a) $f(x) = \ln x$ b) $f(x) = e^{\frac{1}{x-1}}$ c) $f(x) = \ln(x-1)$

8. Which of the following functions are continuous for all real numbers?

a) $f(x) = x^{\frac{1}{x}}$ b) $f(x) = \tan x$ c) $f(x) = e^x$

9. For the following piecewise function, find any values of x for which $f(x)$ is not continuous.

$$\begin{cases} \sin x & x < 0 \\ x & 0 \leq x \leq 1 \end{cases}$$