Lecture Twenty Practice

Practice problems for

Abstract. *Practice problems for Lecture Twenty Content*

Problem. 1 : Consider the function $f(x) = x^2 - x - \ln(x)$.

What is the domain of this function? (? , ?)

Compute the following limits:

$$\lim_{x \to \infty} f(x) = \text{?}$$

Compute the following limits:

$$\lim_{x \to 0^+} f(x) = \text{?}$$

Problem. 2 : Consider the function $f(x) = x^4 - 2x^2 + 3$.

What is the domain of this function? (? , ?)

Are there any vertical asymptotes?

yes

no

? Check work

Compute the following limits:

$$\lim_{x\to-\infty} f(x) = \boxed{?}, \lim_{x\to\infty} f(x) = \boxed{?}$$

Problem. 3 : Consider the function $f(x) = x^4 e^{-x}$.

What is the domain of this function? ($\boxed{?}$, $\boxed{?}$)

Are there any vertical asymptotes?

yes

no

? Check work

Compute the following limits:

$$\lim_{x\to-\infty} f(x) = \boxed{?}, \lim_{x\to\infty} f(x) = \boxed{?}$$

Problem. 4 : Consider the function $f(x) = \cos^2(x) - 2\sin(x)$ on the interval $[0, 2\pi]$.

Are there any vertical asymptotes?

yes

no

? Check work

Are there any horizontal asymptotes?

yes

no

? Check work

Problem. 5 : Consider the function $f(x) = x^2 \ln(x)$.

What is the domain of this function? ($\boxed{?}$, $\boxed{?}$)

Compute the following limits:

$$\lim_{x\to\infty} f(x) = \boxed{?}$$

Compute the following limits:

$$\lim_{x \to 0^+} f(x) = \square$$