

Test 1: Analysis 2
(Mechanical engineering and Process engineering)

Exercise 01:

Show that the following functions are equivalent, in the same order, in higher order, or in lower order:

بين أن الدوال التالية، متكافئة، عند نفس الرتبة، عند رتبة أعلى، أو عند رتبة أدنى،

1. $f(x) = \sin(x) + x^2$ and $g(x) = x - x^2 + x^3$. As x approaches 0.
2. $f(x) = \frac{1}{x}$ and $g(x) = \frac{1}{x^2}$. As x approaches infinity.
3. $f(x) = 1 - \cos(x)$ and $g(x) = x^2$. As x approaches 0.
4. $f(x) = \frac{x+1}{x^2}$ and $g(x) = \frac{1}{x}$. As x approaches $+\infty$.
5. $f(x) = \sin(2x)$ and $g(x) = \sin(3x)$. As x approaches 0.
6. $f(x) = \sin x + x^2$ and $g(x) = x - x^2 + x^3$. As x approaches 0.

Exercise 02:

Give the first 4 terms of Taylor series for the following functions:

أعطي الحدود الأربعة الأولى لسلسلة تايلر من أجل الدوال التالية:

(a) $\ln x$ around $a = 1$

(b) $\sin(x)$ around $a = \frac{\pi}{4}$

سؤال الدرس:

اذكر دسوز انتكامل بالتجزئة

Lecture question: state the method of integration by parts

Test 1: Analysis 2
Civil engineering

Exercise 01:

Show that the following functions are equivalent, in the same order, in higher order, or in lower order:

بين أن الدوال التالية، متكافئة ، عند نفس الرتبة ، عند رتبة أعلى ، أو عند رتبة أدنى ،

1. $f(x) = x$ and $g(x) = \frac{x}{2}$ as x approaches 0.
2. $f(x) = \frac{1}{x}$ and $g(x) = \frac{1}{2x}$ as x approaches infinity.
3. $f(x) = \sqrt{x}$ and $g(x) = x^2$ as x approaches 0.
4. $f(x) = \ln(x)$ and $g(x) = x - 1$ as x approaches 1.
5. $f(x) = x^2$ and $g(x) = x^2 + x$ as x approaches 0.
6. $\sin(x)$ and $g(x) = \cos(x) - 1$ as x approaches 0.

Exercise 02:

Give the first 4 terms of Taylor series for the following functions:

أعطي الحدود الأربعة الأولى لسلسلة تايلر من أجل الدوال التالية:

1. $\cot(x) = \frac{\cos(x)}{\sin(x)}$ around zero.
2. $\frac{1}{x}$ around $a = 1$.

Lecture question

سؤال الدرس:

$$\int f(ax) dx = ?$$