Petroleum University of Technology

Ahwaz Faculty of Petroleum

Mid Term Exam of 2nd Term of 89-90

Course Title: Applied Mathematics		**Exam Date:** Khordad 3, 1390
Exam Time: 90 Min.	**OPEN BOOK**	**Level:** B.Sc☑ M.Sc☐ Ph.D.☐
Student Full Name:	**Student Number:**	

▸ Attempt all questions ◂

1. Let $f(x)=\sqrt{x+1}$

a) Find the third Taylor polynomial $P_3(x)$ about $x=0$

b) Use $P_3(x)$ to approximation $\sqrt{0.5}$

c) Determine the actual error of the approximation in part **(b)**.

2. Let $f(x)=-x^3-\cos x$, $x_0=-1$ and $x_1=0$. Find x_3 using Secant method.

3. Let $f(x)=-x^3-\cos x$ and $x_0=-1$. Find x_2 using Newton's method. Could $x_0=0$ be used for this problem?

4. Let $f(x)=x^3-9x^2+12$, $x_0=0$, $x_1=1$ and $x_2=-1$. Find x_3 using Muller's method.

5. Show that the polynomial interpolating the following data has degree 3.

x	-2	-1	0	1	2	3
$f(x)$	1	4	11	16	13	-4

Find $f(4)$.

6. Use Romberg's integration to compute $\int_0^1 x^2e^{-x}dx$ correct to $O(h^4)$.

7. Evaluate $\int_0^1 \int_x^{x+1} \frac{dy\,dx}{1+y^3}$

Good luck…