King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math371 Term(173) First Exam ***July 10, 2018***

Time:190 min.

Name: ID: Sec.:#

Justify all your steps.

Question	Grades
Q1/28	
Q2/22	
Q3/15	
Q4/20	
Q5/15	
Total/100	

Problem 1. (8+12+8 points)

a) Estimate the number of iterations required to achieve 10^{-1} accuracy to approximate the solution of the equation $4\sin x = e^x$, $0 \le x \le 1$ by using Bisection method,

b) Find the approximation of the solution for part (a) by using Bisection method.

c) Find the approximation of the solution for part (a) by using secant method. $(p_0 = 0, p_1 = 0.5)$

Problem 2. (14+8 points)

a) Show that the function $g(x) = \frac{1}{4}\ln(x+2) - \frac{1}{4}x$ has a unique fixed point on $[-0.4, 1]$.

b) Estimate the number of iterations required to achieve 10^{-3} accuracy for part (a) with $p_0 = 0$

Problem 3. (15 points) Find Maclaurin expansions for $h(x)=e^{2x}$ of order 5 and $g(h)=\frac{1}{x+1}$ of order 4, then experiment and find the order of approximation for their sum.

Problem 4.(20 points) Given the data $(0,-1),(0.5,-0.75),(1,0)$. Construct interpolation polynomial of degree two to approximate, then approximate *f(0.7)*.

Problem 5 (15 points) The Taylor series of cos(x) is $\cos(x) = \sum_{k=0}^{\infty} (-1)^k \frac{x^{2k}}{(2k)!}$. Write a MATALAB code to approximate $cos(\frac{7\pi}{5})$ and to find the number of terms to achieve 0.001 accuracy.

The End