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| Department of Industrial Engineering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Mathematics 1 | Mid-Term Exam    |
| Answer <b>All</b> questions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | April 1, 2016 | Duration: 1 hour |
| <p>[1] Find the limits: (a) <math>\lim_{x \rightarrow 1} \frac{x^2 - 1}{x^3 + 1}</math> (b) <math>\lim_{x \rightarrow 0} \frac{\tan 2x}{x}</math> (c) <math>\lim_{x \rightarrow 0} \frac{x}{3^x - 1}</math> (d) <math>\lim_{x \rightarrow 0} \frac{\ln(1 + x)}{2x}</math></p> <p>[2] Find <math>y'</math> from the following:</p> <p>(a) <math>y = 2x^3 + 3^x</math> (b) <math>y = \cos x + 3\sin x</math> (c) <math>y = \ln x + \log x</math><br/> (d) <math>y = 4x + \ln(x + 3)</math> (e) <math>y = \tan x \cdot 4^x</math> (f) <math>y = (x + \ln x)^8</math></p> <p>[3] (a) Determine the maximum and minimum points of : <math>f(x) = x^3 - 12x + 1</math><br/> (b) Write the Maclurin's expansion of : <math>f(x) = x + \sin x</math></p> <p>[4] Find the integrals:</p> <p>(a) <math>\int (2 + x^2 - 2^x) dx</math> (b) <math>\int (\cos x + \sin 3x) dx</math> (c) <math>\int (x^2 + 1)^2 dx</math></p> |               |                  |

*Good Luck*

*Dr. Mohamed Eid*