Department of Basic Science **Level: 1** **Examiner: Dr. Mohamed Eid** **Time allowed: 3 hours**	Pyramids higher Institute P.H.I. For Engineering And Technology معهد الأهرامات العالى للهندسة و التكنولوجيا	**Prep. Year: Final Exam** **Course: Mathematics 1** **Course Code: BAS 013 A** **Date: May 21, 2015**

The Exam consists of one page **Answer all questions** **No. of questions: 5** **Total Mark:** 70

Question 1

Find $\mathbf{y`}$ from the following: 18

(a) $y = 2x^4 + 3\cos x$ (b) $y = x^3.\sec x$ (c) $y = \sin 2x + \cos x^2$

(d) $y = \tan x^4 + \tan^4 x$ (e) $y = \frac{x+2}{x+\sin x}$ (f) $y = (x^5 + x^{-5})^8$

Question 2

Find the limits: 12

(a) $\lim_{x\to 1} \frac{3-\sqrt{x}}{3-x^2}$ (b) $\lim_{x\to 1} \frac{x^3-2x^2+x}{x^2+3x-4}$ (c) $\lim_{x\to 0} \frac{x\sin x}{x^2+\tan x}$ (d) $\lim_{x\to\infty} \frac{2+x^5}{x+2x^5}$

Question 3

(a)Determine maximum and minimum points of the functions : 6

(i) $f(x) = x^3 - 3x^2 + 1$ (ii) $f(x) = x^3 + 1$

(b) Write the Maclurin's expansion of the function $f(x) = x + \frac{1}{1+2x}$. 4

Question 4

(a)State the definition of the parabola. 3

(b)Write the equation of circle where the points (2, –1), (2, 3) are ends of diameter. 3

(c)Find the radical axis and the points of intersection of the circles: 4

$x^2 + y^2 + 2x - 2 = 0$, $x^2 + y^2 + y - 2 = 0$.

(d)Find center, vertices and sketch the hyperbola $x^2 - 4y^2 - 4x - 8y + 4 = 0$. 5

Question 5

(a) State the definition of the ellipse. 3

(b)Find the angle between the lines: x + y – 1 = 0, x – 2y + 2 = 0 3

(c)Find center, vertices and sketch the ellipse $x^2 + 4y^2 - 4x + 8y + 4 = 0$. 5

(d)Determine the type of the curve $2x^2 - 3xy + 2y^2 - 16 = 0$. 4

Good Luck *Dr. Mohamed Eid*

ID:	الاسم:

Math. I	Mid-Term Exam	March 28, 2015	Time: 1 Hour

[1]Find $\mathbf{y`}$ from the following:

(a) $y = 2x^4 + 3\cos x$ y`=

(b) $y = x^{-3} + \sin 2x$ y`=

(c) $y = (x + \tan x)^4$ y`=

(d) $y = \sec x^2 + \sin^2 x$ y`=

(e) $y = \sqrt{x}.\tan^{-3} x$ y`=

(f) $y = \frac{x+\cos x}{x+\tan x}$ y`=

[2]Find the limits:

(a) $\lim_{x\to 1} \frac{\sqrt{x} - 3}{x^2 - 2} =$

(b) $\lim_{x\to 1} \frac{x^2 - 2x + 1}{x^2 + 2x - 3} =$

(c) $\lim_{x\to 0} \frac{x - \sin x}{x - \tan x} =$

(d) $\lim_{x\to \infty} \frac{x^4 - 1}{x^2 + x^5} =$

[3](a) Determine maximum and minimum points of the function: $f(x) = x^3 - 12x$.

(b) Write the Maclurin's expansion of the function: $f(x) = x + \frac{1}{x+1}$

Quiz

[1]Find the limits:

(a) $\lim_{x\to 1}\frac{\sqrt{x}-2}{x^3-2}$ (b) $\lim_{x\to 1}\frac{\sqrt[4]{x}-1}{x^3-1}$ (c) $\lim_{x\to 0}\frac{\sin 2x}{x^3+\tan x}$ (d) $\lim_{x\to\infty}\frac{x^2-1}{x+x^3}$

[2]Find y` where:

(a) $y = 3x^{-2} + 2\cos x$ (b) $y = 3 + \tan x^3$ (c) $y = \tan^{-3}x + (\sec x)^3$

(d) $y = x^3.\sin 3x$ (e) $y = (2x + \cos x)^8$ (f) $y = \frac{x^4-1}{x+\sin x}$