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: September, 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) $y = 3x^2 + 2\sin x$ (b) $y = x^4.\tan x$ (c) $y = \sin 3x - \cos x^3$

(d) $y = \sec x^2 + \cot^3 x$ (e) $y = \frac{\sin x}{x+x^3}$ (f) $y = (x^6 + x^{-3})^5$

Question 2

Find the limits: 12

(a) $\lim_{x\to 1} \frac{2-\sqrt{x}}{3-x^2}$ (b) $\lim_{x\to 2} \frac{x^2-4}{x^2-5x+6}$ (c) $\lim_{x\to 0} \frac{\tan x}{x^2+\sin x}$ (d) $\lim_{x\to \infty} \frac{x+x^2}{3+x^3}$

Question 3

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

(i) $f(x) = x^3 - 12x$ (ii) $f(x) = (x-2)^3 + 4$

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

Question 4

(a)State the definition of the circle. 3

(b)Write the equation of circle of center (3, –1) and radius 2. 3

(c) Show that the circles are orthogonal and find the points of intersection: 4

$(x-1)^2 + (y-1)^2 = 3, \quad (x+1)^2 + (y-1)^2 = 1$

(d)Determine the vertex, focus and sketch the parabola $x^2 - 2x - 4y - 3 = 0$. 5

Question 5

(a) State the definition of the parabola. 3

(b)Find center, vertices and sketch the ellipse $x^2 + 4y^2 - 4x + 8y + 4 = 0$. 6

(c)Determine the type of the curve $2x^2 + y^2 - x + 2y - 1 = 0$. 6

Good Luck *Dr. Mohamed Eid*