



Answer the following questions

First Calculus

Question 1 Find the following integrals

(a).

i) $\int \sqrt{\frac{x+1}{x-3}} dx$

ii) $\int \cos^7 x dx$

iii) $\int \frac{dx}{x \ln x}$

iv) $\int \frac{\sin^2 x \cos x}{1 - \sin x} dx$

v) $\int \frac{dx}{x^3 \sqrt{x^2 - 1}}$

(b).

i) $\int \frac{dx}{2x^2 - 2x + 3}$

ii) $\int \frac{2x}{x^3 + x^2 + x + 1} dx$

iii)

$\int \sqrt{3 + 2x - x^2} dx$

iv) $\int \frac{26 \sin x - 13 \cos x}{4 \sin x - 7 \cos x} dx$

Question 2(25 marks)

(a). (10 marks) prove that

i) $\int \operatorname{cosec} x dx = \ln(\cot x - \operatorname{cosec} x) + c$

ii) $\int \frac{dx}{\sqrt{a^2 + x^2}} = \sinh^{-1} \frac{x}{a} + c$

(b). (10 marks) i) Find the volume generated by revolving about x-axis for the

area bounded by the curves: $x^2 + y^2 = 25$, $5x - 4y = 0$ and $y = 0$ in the first quadrant

ii) Using Simpson's rule, find the integral $\int_0^1 \frac{2x}{1+x^2} dx$, then find the

value of $\ln 2$ take $n = 4$

Second Analytic Geometry

Question 3(50 marks)

- (a) (8 marks) By suitable transformation of coordinates axes remove first degree term of the equation $x^2 - x y + 2y^2 - 2x - 6y + 7 = 0$

باستخدام تحويل محاور الاحداثيات احذف الحدود من الدرجة الاولى

- (b) (8 marks) Find the value of (λ) which makes the following equation $2x^2 + 7xy + (\lambda)y^2 + 5x + 7y - 3 = 0$ represents two straight lines then find their point of intersection, the angle between them, and bisector equation

اوجد قيمة λ التي تجعل المعادلة تمثل معادلة خطين مستقيمين ثم اوجد نقطه تقاطعهما ،
الزاوية بينهما، و معادلة المنصفين.

- (c) (8 marks) Find the equation of circles which touch the positive coordinate axes and passing through the point $(4,8)$, then find equation of tangents from origin. اوجد معادلة الدائرة التي تمس المحاور الموجبة و تمر بالنقطة ثم اوجد معادلة المماسات من نقطة الاصل

- (d) (8 marks) Find the equation of tangent and normal to the parabola $x^2 - 8x + 8y = 8$ at point

اوجد معادلتى المماس و العمودي للقطع المكافئ

- (e) (8 marks) a point $P(x,y)$ moves such that the sum of its distance from points $(1,4)$ and $(1,-2)$ equal 8 units. Find the equation of path

نقطة تتحرك بحيث يكون مجموع بعديها عن نقطتين مقدار ثابت يساوي ٨ وحدات اوجد معادلة المسار

- (f) (8 marks) Discuss and sketch the hyperbola

$9x^2 - 16y^2 - 18x - 64y - 199 = 0$, then find the foci, directrix , and asymptotes.

ناقش و ارسم القطع الزائد ثم اوجد البؤر، الدليل، و معادلة الخطين التقاربيين

- (g) (2 marks) Define each of the following terms: Hyperbola, and Tangent Line

With our best wishes

This exam measures the following ILOs

Question Number	Q1-a	Q2-a	Q3-a	Q3-g	Q1-b	Q2-b	Q3-b	Q3-d	Q1-c	Q2-b	Q3-c	Q3-d	Q3-f
	a2-2	a4-1	a5-1	a5-2	b2-1	b5-2	b5-1	b4-2	c4-2	c5-1	c7-2	c5-2	c5-2
Skills	Knowledge & Understanding Skills				Intellectual Skills				Professional Skills				