Math106 Midterm1

Question 1(2+3+3)

a) Find the value of $F'(0)$ if $F(x) = (\cos x) . \int_0^{\tan x} \sqrt{1 + t^2}\, dt$

b) Evaluate the indefinite integral $\int \dfrac{dx}{\sqrt{x}(1+\sqrt{x})^2}$

c) Approximate the integral $\int_0^5 \dfrac{2^x\, dx}{1+x}$ using Trapezoid rule with n=5.

Question 2(3+2+3)

a) Evaluate the integral $\int (\ln x + 1)3^{x\ln x}\, dx$

b) If $y = \dfrac{x(x^2+1)^3}{\sqrt[4]{2x-1}}$ find y'

c) Compute $\int \dfrac{\sec^2 x . dx}{\sqrt{9-(\tan x)^2}}$

Question 3(3+3+3)

a) Find $\int \dfrac{dx}{x\sqrt{16x^4-1}}$

b) Evaluate the integral $\int \dfrac{x^2\, dx}{\sqrt{x^6-25}}$

c) Compute $\int \dfrac{dx}{x\ln x\sqrt{1-(\ln x)^4}}$

Math106 Midterm2

Question 1(2+3+2)

a) Find the $\lim\limits_{x \to 0} \dfrac{\int_0^x \sin(t^2)dt}{x^3}$

b) Evaluate the indefinite integral $\int \cosh^{-1}(x)\, dx$

c) Compute the integral $\int (sinx)^3 (cosx)^7 dx$

Question 2(3+3+3)

a) Evaluate the integral $\int \dfrac{dx}{(x^2+4)^2}$

b) Find $\int \dfrac{dx}{x^4+x^2}$

c) Compute $\int \dfrac{dx}{x^{1/6}+x^{1/3}}$

Question 3(3+3+3)

a) Find $\int \dfrac{dx}{3+\cos x+2\sin x}$

b) Show that the integral $\int_1^{\infty} \dfrac{lnx}{x^2} dx$ converges and find its value.

c) Sketch the region bounded by the curves $x = y^2$, $x = 8 - y^2$, and find its area.

KING SAUD UNIVERSITY

Math Department

Final exam106

Second Semester 39/40

April 14 2019

Time: 180mn

Question 1(2+2)

a) Approximate the integral $\int_0^6 \sqrt{1+x^2}\,dx$ using Simpson's Rule with n=6

b) Find the number c in the mean value theorem for $f(x) = \dfrac{8}{x^2}$ on [2, 4]

Question 2(3+3+3)

a) Evaluate the integral $\int \dfrac{dx}{\sqrt{e^{6x}-25}}$

b) Compute the integral $\int \dfrac{dx}{x\sqrt{1-x^8}}$

c) Find $\int x\tan^{-1}(x)\,dx$

Question 3(3+3+3)

a) Compute the following integral $\int (tanx)^5(secx)^3\,dx$

b) Find the integral $\int \cos(7x)\cos(5x)\,dx$

c) Evaluate the integral $\int \dfrac{dx}{(x^2-1)^{3/2}}$

Question 4(3+3+3)

a) Evaluate the integral $\int \dfrac{2x-1}{x^2+4x+20}\,dx$

b) Sketch the region bounded by the curves: $y = 2 - x^2$, $y = x$,

$x = 0$, $x = 2$ and find its area.

$x = 0$, $x = 2$ and find its area.

b) Set up an integral for the volume obtained by revolving the region bounded by the curves $y = x^2, y = 4$ about the line of equation

i) $y = 6$

ii) $x = -3$.

Question5(3+3+3)

a) Sketch the region R that lies inside the curve $r = 2\sin\theta$ and outside

the curve $r = 2 - 2\sin\theta$, and find its area.

b) Find the area of the surface obtained by revolving the curve $r = 4\cos\theta$
$0 \le \theta \le \pi/2$ about the y-axis.

c) Find the length of the curve given by the equations $x = \dfrac{t^4}{4}$, $y = \dfrac{t^6}{6}$
$0 \le t \le 1$.