King Saud University
Science and Medical Studies Section for girls
College of Science
Department of Mathematics

Math 111
First Term 1434H
Final Exam
3 Hours

Name:	Student No.:
Section No.:	Sequence No.:

Question No.	I	II	III	IV	Total
Mark					

QUESTION I

Choose the correct answer

1. $\underset{n\to\infty}{Lim}\sum_{i=1}^{n}\frac{5i}{n^2}$ is equal to:

i. 5 ii. $\frac{5}{2}$ iii. 0 iv. None of the previous.

2. $A=\frac{b-a}{3n}\left[f(x_0)+4f(x_1)+2f(x_2)+4f(x_3)+........+4f(x_{n-1})+f(x_n)\right]$ is an approximation value of $\int_a^b f(x)dx$ using :

i. Midpoint Rule ii. Trapezoidal Rule. iii. Simpson's Rule. iv. None of the previous.

3. An estimation value of $\int_1^2 \frac{1}{\sqrt[3]{x}}dx$

i. $\frac{1}{\sqrt[3]{2}} \le \int_1^2 \frac{1}{\sqrt[3]{x}} \le 1$ ii. $1 \le \int_1^2 \frac{1}{\sqrt[3]{x}} \le \sqrt[3]{2}$ iii. $0 < \int_1^2 \frac{1}{\sqrt[3]{x}} \le \sqrt[3]{2}$ iv. None of the previous.

4. If $F(x)=\int_{x^2}^{\pi}\cosh t\, dt$, then $F'(x)$ equals

i. . $-2x\sinh x^2$ ii. $-2x\cosh x^2$ iii. $2x\cosh x^2$ iv. None of the previous.

5. The partial fraction decomposition of $\frac{1}{x^4+x^3+x^2}$ has the form:

i. $\frac{A}{x^2}+\frac{Bx+C}{x^2+x+1}$ ii. $\frac{A}{x}+\frac{B}{x^2}+\frac{Cx+D}{x^2+x+1}$ iii. $\frac{A}{x}+\frac{B}{x^2}+\frac{C}{x+1}+\frac{D}{(x+1)^2}$ iv. None of the previous.

6. $F(x)=\sin x$ is an anti-derivative of:

i. $\frac{\sin^2 x}{2}$. ii. $-\cos x$. iii. $\cos x$. iv. None of the previous.

7. $\int_1^2 e^{\pi+\ln x^2}dx$ is equal to:

i. $\frac{7}{3}e^{\pi}$. ii. $\frac{7^3}{6}e^{2\pi}$. iii. $e^{\pi+\ln 4}-e^{\pi}$. iv. None of the previous.

8. If $(6, \frac{\pi}{2})$ is a polar coordinate representation of a point, then the corresponding rectangular representation is:

i. $(0,6)$. ii. $(6,0)$. iii. $(0,-6)$. iv. None of the previous.

9. A polar coordinate representation of the rectangular point $(2,5)$ is:

i. $\left(\sqrt{29}, \tan^{-1}\frac{2}{5}\right)$. ii. $(-\sqrt{29}, \tan^{-1}\frac{5}{2})$. iii. $(-\sqrt{29}, \tan^{-1}\frac{5}{2}+\pi)$ iv. None of the previous.

10. The parametric equations $x=\sqrt{t}$, $y=2\ln t$ can be converted to the rectangular equation:

i. $y=2\ln x$. ii. $y=4\ln x$. iii. $y=\ln\sqrt{x}$. iv. None of the previous.

QUESTION II

1. Sketch the graph of the polar equation $r=4-4\cos\theta$, and then find the area of the region when $0\le\theta\le\frac{\pi}{2}$

2. Show that the rectangular equation $\frac{x}{\sqrt{x^2+y^2}}=5y$, $y\neq 0$ can be converted to the polar equation $r=\frac{1}{5}\cot\theta$.

3.Show that for $a,b \in R$

$$ln(ab) = lna + lnb \ .$$

QUESTION III

Evaluate the following integrals:

i. $\int (2x+1)\cos x dx$

ii. $\int e^{x} \operatorname{sech} x dx$

iii. $\int \tan^3 x \sec^4 x \, dx$

iv. $\int_1^\infty \frac{\ln x}{x} \, dx$.

v. $\int \frac{x}{4-x^4} dx$

QUESTION IV

1. Find the arc length of the function $y = \frac{1}{3}x^{\frac{3}{2}} - x^{\frac{1}{2}}$ from $x = 1$ to $x = 4$.

2. Sketch and find the area determined by the following functions

$$x = 3y\ ,\ \ x = 2 + y^2$$

(DO NOT INTEGRATE)

3. Sketch and then find the volume of the solid formed by revolving the region bounded by the equations $y = \sqrt{x}$, $y = 2$, and $x = 0$ **(DO NOT INTEGRATE)**

1) About x-axis.

2) About y-axis

GOOD LUCK ☺