جامعة الملك عبدالعزيز.

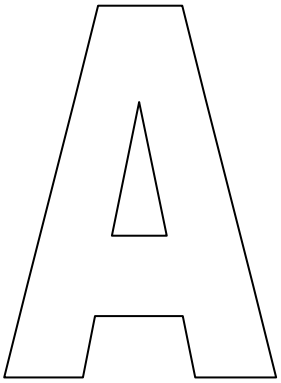
كلية العلوم. الاسم:_____

قسم الرياضيات. الرقم الجامعي:_____

math 202.
Calculus 2.

Second Exam

Date: Sunday 25 / 1 / 1434 H.
Time: from 18:00 to 19:30.



- تأكد من أن رمز نموذج الإجابة لديك هو A .
- أكتب اسمك على هذا النموذج ثم تأكد من تعبئة جميع بيانات نموذج الإجابة **خاصة رقمك الجامعي و بقلم الرصاص.**
- تأكد من تعبئة نموذج الحضور بصورة صحيحة.
- أجب عن جميع الأسئلة الآتية بتظليل الخيار الصحيح في نموذج الإجابة **بقلم الرصاص**.
- ممنوع استخدام الآلة الحاسبة.

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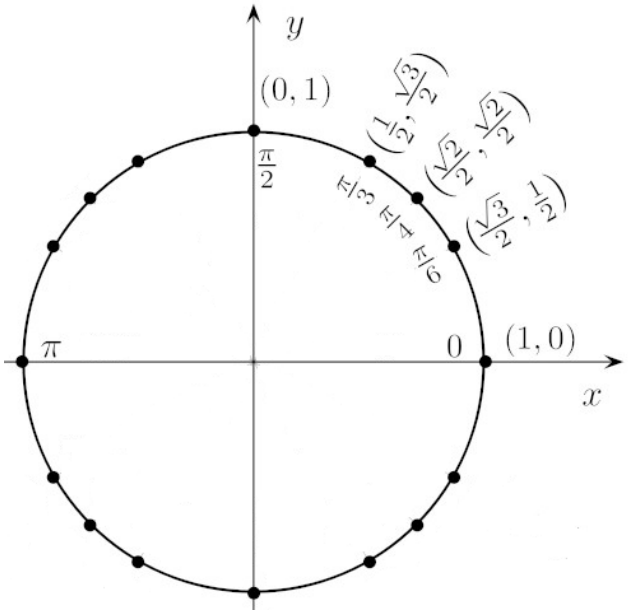
هذه الصفحة تتضمن بعض القوانين التي قد تحتاجها لحل بعض أسئلة هذا الامتحان.



The Unit Circle

$\sin mx \sin nx = \frac{1}{2}[\cos(m-n)x - \cos(m+n)x]$	$\cos^2\theta = \frac{1+\cos 2\theta}{2}$
$\sin mx \cos nx = \frac{1}{2}[\sin(m-n)x + \sin(m+n)x]$	$\sin^2\theta = \frac{1-\cos 2\theta}{2}$
$\cos mx \cos nx = \frac{1}{2}[\cos(m-n)x + \cos(m+n)x]$	$\sin 2\theta = 2\sin\theta\cos\theta$
$\int \frac{dx}{x^2+a^2} = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + C$	$\int \frac{dx}{\sqrt{a^2-x^2}} = \sin^{-1}\left(\frac{x}{a}\right) + C$

A

1. $\int \sin^2 x \quad dx =$	
(A) $\frac{x}{2} + \frac{\sin(2x)}{4} + c$	(B) $\frac{x}{2} + \frac{\cos(2x)}{4} + c$
(C) $\frac{x}{2} - \frac{\cos(2x)}{4} + c$	(D) $\frac{x}{2} - \frac{\sin(2x)}{4} + c$
(E) $\frac{x}{4} - \frac{\sin(2x)}{4} + c$	

Q2. $\int \cos(5x)\cos(3x)\,dx =$	
(A) $\frac{\sin(2x)}{4} + \frac{\sin(8x)}{16} + c$	(B) $-\frac{\sin(2x)}{4} - \frac{\sin(8x)}{16} + c$
(C) $\frac{\sin(2x)}{2} + \frac{\sin(8x)}{8} + c$	(D) $\frac{\sin(2x)}{4} - \frac{\sin(8x)}{16} + c$

A

Q3. $\int \tan^3 x \ \sec^3 x \ dx =$			
(A) $\frac{\sec^5 x}{5} + \frac{\sec^3 x}{3} + c$	(B) $\frac{\tan^4 x}{4} + \frac{\sec^4 x}{4} + c$	(C) $\frac{\sec^5 x}{5} - \frac{\sec^3 x}{3} + c$	(D) $\frac{\tan^5 x}{5} + \frac{\tan^3 x}{3} + c$

Q4. $\int \frac{\sqrt{4-x^2}}{x^2} dx =$	
(A) $\frac{\sqrt{4-x^2}}{x} - \sin^{-1}\left(\frac{x}{2}\right) + c$	(B) $-\frac{\sqrt{4-x^2}}{x} - \sin^{-1}\left(\frac{x}{2}\right) + c$
(C) $\frac{\sqrt{4-x^2}}{x} + \sin^{-1}\left(\frac{x}{2}\right) + c$	(D) $\frac{\sqrt{4+x^2}}{x} - \sin^{-1}\left(\frac{x}{2}\right) + c$

Q5. $\int \frac{1}{\sqrt{x^2-1}}\,dx=$	
(A) $\sin^{-1}(x)+c$	(B) $\cos^{-1}(x)+c$
(C) $\ln\lvert x+\sqrt{x^2-1}\rvert+c$	(D) $\ln\lvert x-\sqrt{x^2-1}\rvert+c$

Q6. $\int \frac{x}{\sqrt{x^2+49}}\,dx\ =$	
(A) $\sqrt{x^2+49}$ +c	(B) $\frac{\sqrt{x^2+49}}{14}+c$
(C) $\frac{\sqrt{x^2+49}}{7}+c$	(D) $-\frac{\sqrt{49+x^2}}{x}-\tan^{-1}\left(\frac{x}{2}\right)+c$

Q7. $\int \frac{1}{(x+4)(x+5)}\,dx$	
(A) $-\ln\left\|\frac{x+4}{x+5}\right\| + c$	(B) $\ln\left\|\frac{x-5}{x+4}\right\| + c$
(C) $\ln\left\|\frac{x-4}{x-5}\right\| + c$	(D) $\ln\left\|\frac{x+4}{x+5}\right\| + c$

Q8. $\int \frac{1}{x^2\sqrt{4-x^2}}\,dx =$			
(A) $-\frac{\sqrt{4-x^2}}{4x} + c$	(B) $\frac{\sqrt{4-x^2}}{4x} + c$	(C) $\frac{\sqrt{4-x^2}}{x} + c$	(D) $-\frac{\sqrt{2-x^2}}{4x} + c$

Q9. $\int \frac{1}{\sqrt{8-x^2-2x}}\,dx =$	
(A) $\cos^{-1}\left(\frac{x+1}{3}\right) + c$	(B) $\sin^{-1}\left(\frac{x+1}{2}\right) + c$
(C) $-\sin^{-1}\left(\frac{x+1}{3}\right) + c$	(D) $\sin^{-1}\left(\frac{x+1}{3}\right) + c$

A

Q10.

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

(A)

$$-\frac{1}{9}\ln\left|\frac{x+3}{x}\right| + \frac{1}{3x} + c$$

(B)

$$\frac{1}{9}\ln\left|\frac{x+3}{x}\right| + \frac{1}{3x} + c$$

(C)

$$\frac{1}{9}\ln\left|\frac{x-3}{x}\right| - \frac{1}{3x} + c$$

(D)

$$\frac{1}{9}\ln\left|\frac{x+3}{x}\right| - \frac{1}{3x} + c$$

Q11.

$$\int \frac{1+\sin x}{\sin^2 x}dx =$$

(A)

$$-\cot x + \ln|\csc x - \cot x| + c$$

(B)

$$\cot x + \ln|\csc x - \cot x| + c$$

(C)

$$-\cot x + \ln|\csc x + \cot x| + c$$

(D)

$$-\cot x - \ln|\csc x - \cot x| + c$$

Q12.

$$\int \frac{\sqrt{x}}{1+x^3}dx =$$

(A)	(B)	(C)	(D)	(E)
$\frac{2}{3}\tan^{-1}\left(x^{\frac{3}{2}}\right)+c$	$\frac{2}{3}\sin^{-1}\left(x^{\frac{3}{2}}\right)+c$	$\ln(1+x^3)+c$	$\tan^{-1}\left(x^{\frac{3}{2}}\right)+C$	$\tan^{-1}(x^3)+c$

Q13.

$$\int \frac{e^{2x}}{e^x+1}dx =$$

(A)	(B)	(C)	(D)	
$e^{-x}-\ln(e^x+1)+c$	$e^x+\ln(e^x+1)+c$	$e^x-\ln(e^x+1)+c$	$e^x-\ln(e^x-1)+c$	

Q14.

$$\int_1^{\infty} \frac{8}{x^5}dx=$$

(A)	(B)	(C)	(D)	
1	$\frac{8}{5}$	2	Divergent	

Q15.

$\int_1^e \frac{1}{x\sqrt[3]{\ln x}}dx$

(A)	(B)	(C)	(D)	
Divergent	$\frac{2}{3}$	$\frac{3}{2}$	$-\frac{3}{2}$	

Q16.

$\int \frac{3x^2-x+5}{x(x^2+5)}dx =$

(A)	(B)
$\ln\lvert x^3+5x\rvert - \tan^{-1}(\frac{x}{\sqrt{5}}) + c$	$\ln\lvert x^3+5x\rvert - \frac{1}{\sqrt{5}}\tan^{-1}(\frac{x}{\sqrt{5}}) + c$
(C)	(D)
$\ln\lvert x^3-5x\rvert - \frac{1}{\sqrt{5}}\tan^{-1}(\frac{x}{\sqrt{5}}) + c$	$\ln\lvert x^3+5x\rvert + \frac{1}{\sqrt{5}}\tan^{-1}(\frac{x}{\sqrt{5}}) + c$

Q17.

Use the formula

$$\int u\tan^{-1}u = \frac{u^2+1}{2}\tan^{-1}u - \frac{u}{2} + c$$

To evaluate

$$\int x^3 \tan^{-1}(x^2)dx =$$

(A) $\frac{x^4+1}{4}\tan^{-1}(x^2) - \frac{x^2}{2} + c$	(B) $\frac{x^4+1}{4}\tan^{-1}(x^2) - \frac{x^2}{4} + c$
(C) $\frac{x^4+1}{4}\tan^{-1}(x^2) + \frac{x^2}{4} + c$	(D) $\frac{x^2+1}{2}\tan^{-1}(x^2) - \frac{x^2}{2} + c$

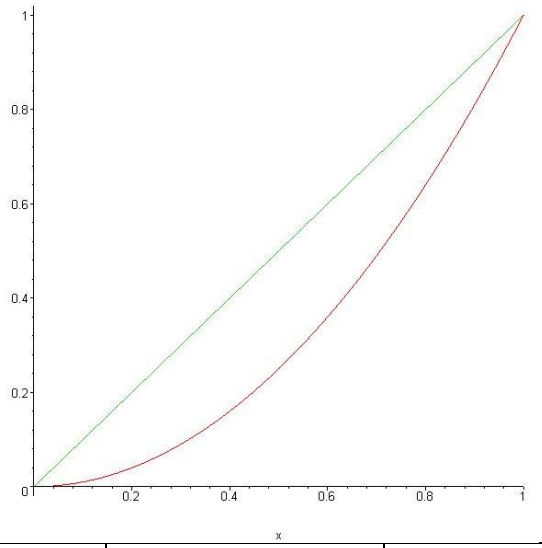
Q18.

$$\int \frac{1}{x+\sqrt[3]{x}}dx =$$

(A) $\frac{3}{2}\ln\left\|x^{\frac{2}{3}} - 1\right\| + c$	(B) $\frac{1}{3}\ln\left\|\sqrt[3]{x} + 1\right\| + c$
(C) $\frac{3}{2}\ln\left\|x^{\frac{2}{3}} + 1\right\| + c$	(D) $\frac{1}{3}\ln\left\|\sqrt[3]{x} - 1\right\| + c$

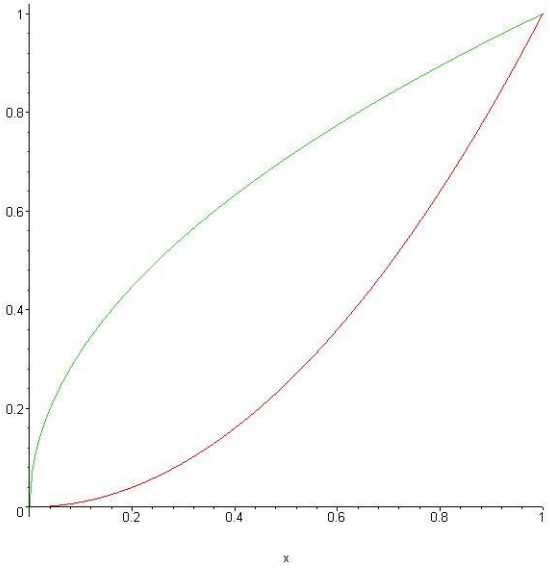
19.

The area of the region enclosed by the parabola $y = x^2$ and the line $y = x$ is



(A)	(B)	(C)	(D)	
$\frac{1}{3}$	$\frac{1}{12}$	$\frac{\pi}{6}$	$\frac{1}{6}$	

Q20. The volume of the solid obtained by rotating the region bounded by the curves $y = x^2$ and $y = \sqrt{x}$, about the x-axis is



(A)	(B)	(C)	(D)	
$\frac{1}{2}\pi$	$\frac{3}{10}\pi$	$\frac{1}{3}\pi$	$\frac{1}{12}\pi$	

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