جامعة الملك عبدالعزيز.

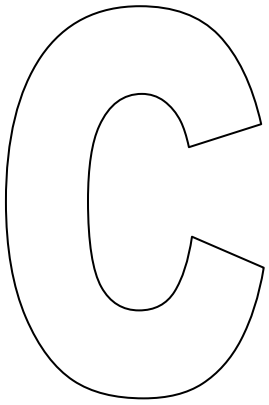
كلية العلوم. الاسم:_____

قسم الرياضيات. الرقم الجامعي:_____

math 202.
Calculus 2.

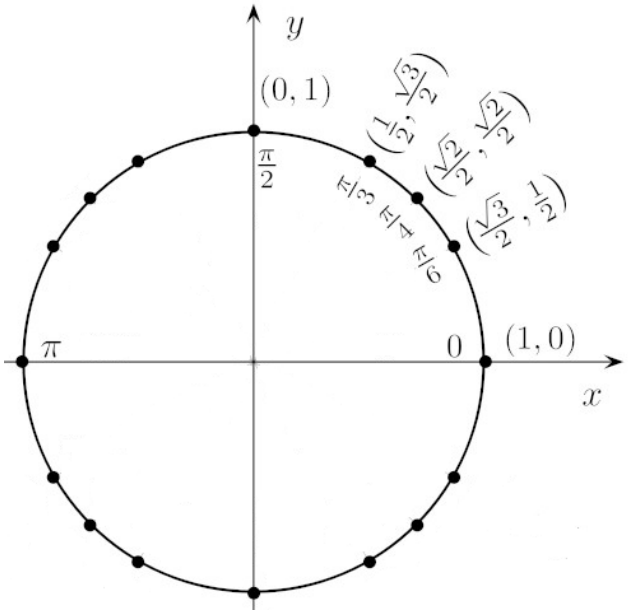
Second Exam

Date: Sunday 16 / 1 / 1433 H.
Time: from 20:15 to 21:45.



- تأكد من أن رمز نموذج الإجابة لديك هو C .
- 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.

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

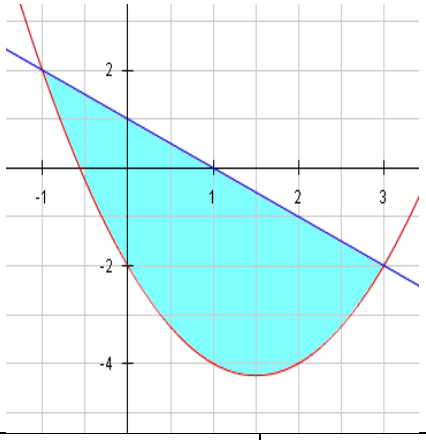


The Unit Circle

$\sin mx \sin nx = \frac{1}{2}[\cos(m-n)x - \cos(m+n)x]$	$\cos^2\theta = \frac{1+\cos 2\theta}{2}$
$\sin mx \cos nx = \frac{1}{2}[\sin(m-n)x + \sin(m+n)x]$	$\sin^2\theta = \frac{1-\cos 2\theta}{2}$
$\cos mx \cos nx = \frac{1}{2}[\cos(m-n)x + \cos(m+n)x]$	$\sin 2\theta = 2\sin\theta\cos\theta$
$\int \frac{dx}{x^2+a^2} = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + C$	$\int \frac{dx}{\sqrt{a^2-x^2}} = \sin^{-1}\left(\frac{x}{a}\right) + C$
$\int \frac{u\,du}{\sqrt{a+bu}} = \frac{2}{3b^2}(bu-2a)\sqrt{a+bu} + C$	$\int e^{au}\sin bu\ du = \frac{e^{au}}{a^2+b^2}(a\sin bu - b\cos bu) + C$
$\int \frac{du}{u^2(a+bu)} = -\frac{1}{au} + \frac{b}{a^2}\ln\left\lvert\frac{a+bu}{u}\right\rvert + C$	$\int u^n \ln u\ du = \frac{u^{n+1}}{(n+1)^2}[(n+1)\ln(u) - 1] + C$
$\frac{d}{dx}(e^x) = e^x$	$\frac{d}{dx}(a^x) = a^x \cdot \ln a$

Q1.

The area of the region enclosed by the parabola $y = x^2 - 3x - 2$ and the line $y = 1 - x$ is



(A)	(B)	(C)	(D)	(E)
$\frac{16}{3}$	$\frac{26}{3}$	$\frac{28}{3}$	$\frac{32}{3}$	$\frac{34}{3}$

السؤال رقم 2 هو تكرار للسؤال رقم 1 و يجب أن تجيب عليه للحصول على درجته

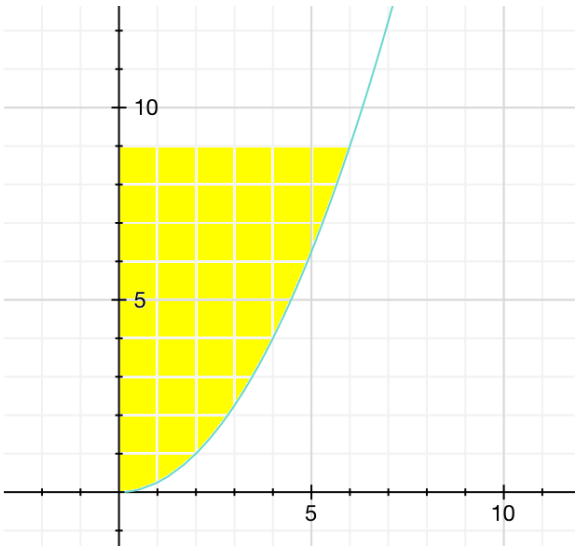
Q2.

The area of the region enclosed the parabola $y = x^2 - 3x - 2$ and the line $y = 1 - x$ is

(A)	(B)	(C)	(D)	(E)
$\frac{16}{3}$	$\frac{26}{3}$	$\frac{28}{3}$	$\frac{32}{3}$	$\frac{34}{3}$

Q3.

The volume of the solid obtained by rotating the region bounded by the curve $x = 2\sqrt{y}$ and the lines $y = 9$, and $x = 0$ about the y-axis is



(A)	(B)	(C)	(D)	(E)
160π	161π	162π	163π	164π

C

السؤال رقم 4 هو تكرار للسؤال رقم 3 و يجب أن تجيب عليه للحصول على درجته

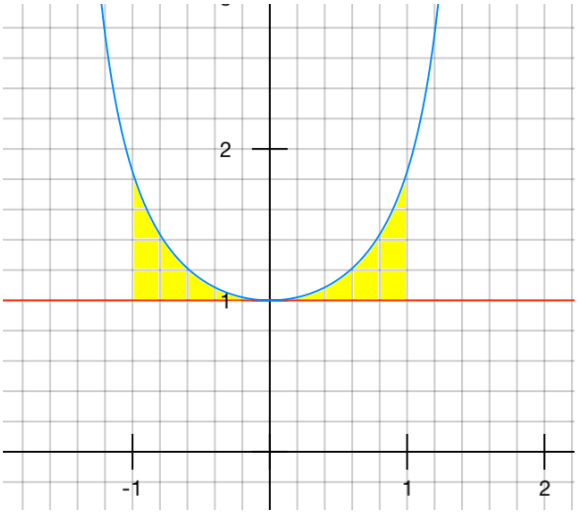
Q4.

The volume of the solid obtained by rotating the region bounded by the curve $x = 2\sqrt{y}$ and the lines $y = 9$, and $x = 0$ about the y-axis is

(A)	(B)	(C)	(D)	(E)
160π	161π	162π	163π	164π

Q5.

The volume of the solid obtained by rotating the region bounded by the curve $y = \sec x$ and the lines $y = 1, x = -1$, and $x = 1$, about the x-axis is



(A)	(B)	(C)	(D)	(E)
$\pi(\tan 1 - 1)$	$2\pi(\tan 1 - 1)$	$2(\tan 1 - 1)$	$2\pi(\tan 1 - 3)$	$\pi(\tan 1 - 3)$

السؤال رقم 6 هو تكرار للسؤال رقم 5 و يجب أن تجيب عليه للحصول على درجته

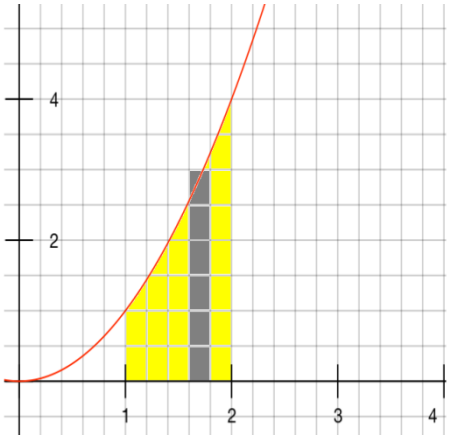
Q6.

The volume of the solid obtained by rotating the region bounded by the curve $y = \sec x$ and the lines $y = 1, x = -1$, and $x = 1$, about the x-axis is

(A)	(B)	(C)	(D)	(E)
$\pi(\tan 1 - 1)$	$2\pi(\tan 1 - 1)$	$2(\tan 1 - 1)$	$2\pi(\tan 1 - 3)$	$\pi(\tan 1 - 3)$

Q7.

The volume of the solid obtained by rotating the region bounded by the curve $y = x^2$ and the lines $y = 0$, $x = 1$, and $x = 2$ about the line $x = 1$ is



(A)	(B)	(C)	(D)	(E)
$\frac{13}{6}\pi$	$\frac{14}{6}\pi$	$\frac{15}{6}\pi$	$\frac{16}{6}\pi$	$\frac{17}{6}\pi$

السؤال رقم 8 هو تكرار للسؤال رقم 7 و يجب أن تجيب عليه للحصول على درجته

Q8.

The volume of the solid obtained by rotating the region bounded by the curve $y = x^2$ and the lines $y = 0$, $x = 1$, and $x = 2$ about the line $x = 1$ is

(A)	(B)	(C)	(D)	(E)
$\frac{13}{6}\pi$	$\frac{14}{6}\pi$	$\frac{15}{6}\pi$	$\frac{16}{6}\pi$	$\frac{17}{6}\pi$

Q9.

$$\int x \cos 3x \, dx =$$

(A)	(B)
$\frac{x \sin 3x}{9} + \frac{\cos 3x}{9} + C$	$\frac{x \sin 3x}{3} + \frac{\cos 3x}{3} + C$
(C)	(D)
$\frac{x \sin 3x}{9} + \frac{\cos 3x}{3} + C$	$\frac{x \sin 3x}{3} + \frac{\cos 3x}{9} + C$

Q10.

$$\int \ln(5x) \, dx =$$

(A)	(B)	(C)	(D)
$\frac{1}{5}x \ln(5x) - x + C$	$x \ln(5x) - x + C$	$x \ln(5x) - 5x + C$	$x \ln(5x) + x + C$

Q11. $\int \sin^3 x \ \cos^6 x \, dx =$	
(A) $\frac{1}{9}\cos^9 x - \frac{1}{7}\cos^7 x + C$	(B) $\frac{1}{9}\cos^9 x + \frac{1}{7}\cos^7 x + C$
(C) $9\cos^9 x - \frac{1}{7}\cos^7 x + C$	(D) $\frac{1}{9}\cos^9 x - 7\cos^7 x + C$
(E) $9\cos^9 x - 7\cos^7 x + C$	

السؤال رقم 12 هو تكرار للسؤال رقم 11 و يجب أن تجيب عليه للحصول على درجته

Q12. $\int \sin^3 x \ \cos^6 x \, dx =$	
(A) $\frac{1}{9}\cos^9 x - \frac{1}{7}\cos^7 x + C$	(B) $\frac{1}{9}\cos^9 x + \frac{1}{7}\cos^7 x + C$
(C) $9\cos^9 x - \frac{1}{7}\cos^7 x + C$	(D) $\frac{1}{9}\cos^9 x - 7\cos^7 x + C$
(E) $9\cos^9 x - 7\cos^7 x + C$	

Q13. $\int \tan^7 x \ \sec^4 x \ dx =$			
(A) $\frac{\sec^8 x}{8} + \frac{\sec^{10} x}{10} + C$	(B) $\frac{\tan^8 x}{8} + \frac{\tan^5 x}{5} + C$	(C) $\frac{\tan^8 x}{4} + \frac{\tan^{10} x}{5} + C$	(D) $\frac{\tan^8 x}{8} + \frac{\tan^{10} x}{10} + C$

Q14. $\int \cos 7x \ \cos 5x \ dx =$	
(A) $\frac{\cos 2x}{4} + \frac{\sin 12x}{24} + C$	(B) $\frac{\sin 2x}{4} + \frac{\cos 12x}{24} + C$
(C) $\frac{\sin 2x}{4} + \frac{\sin 12x}{24} + C$	(D) $\frac{\cos 2x}{4} + \frac{\cos 12x}{24} + C$

Q15.

To evaluate $\int \frac{\sqrt{9-x^2}}{x^2}\,dx$ using Trigonometric substitution, we let

(A) $x = 3\sec\theta,\ 0 \le \theta < \frac{\pi}{2}$ or $\pi \le \theta < \frac{3\pi}{2}$	(B) $x = 3\cosh\theta$
(C) $x = 3\tan\theta,\ -\frac{\pi}{2} < \theta < \frac{\pi}{2}$	(D) $x = 3\sin\theta,\ -\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$

Q16.

$$\int \frac{\sqrt{9-x^2}}{x^2}\,dx =$$

(A) $-\frac{\sqrt{9-x^2}}{x} - \sin^{-1}\left(\frac{x}{3}\right) + C$	(B) $-\frac{\sqrt{9-x^2}}{x} - \tan^{-1}\left(\frac{x}{3}\right) + C$
(C) $\frac{\sqrt{9-x^2}}{x} - \sin^{-1}\left(\frac{x}{3}\right) + C$	(D) $\frac{\sqrt{9-x^2}}{x} - \tan^{-1}\left(\frac{x}{3}\right) + C$

Q17.

To evaluate $\int \frac{\sqrt{x^2-25}}{x^4}\,dx$ using Trigonometric substitution, we let

(A) $x = 5\cosh\theta$	(B) $x = 5\sec\theta,\ 0 \le \theta < \frac{\pi}{2}$ or $\pi \le \theta < \frac{3\pi}{2}$
(C) $x = 5\sin\theta,\ -\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$	(D) $x = 5\tan\theta,\ -\frac{\pi}{2} < \theta < \frac{\pi}{2}$

Q18.

$$\int \frac{\sqrt{x^2-25}}{x^4}\,dx =$$

(A) $\frac{(x^2-25)^{\frac{3}{2}}}{75x^3} + C$	(B) $\frac{(x^2-25)^{\frac{3}{2}}}{57x^3} + C$	(C) $\frac{(x^2-25)^{\frac{1}{2}}}{75x^3} + C$	(D) $\frac{(x^2-25)^{\frac{1}{2}}}{57x^3} + C$

Q19.

The form of the partial fraction decomposition of the rational function $\frac{x^2+2x+1}{(x-3)(x^2+3)^2}$ is

(A) $\frac{A}{x-3} + \frac{B}{x^2+3} + \frac{C}{(x^2+3)^2}$	(B) $\frac{A}{x-3} + \frac{Bx+C}{(x^2+3)^2}$
(C) $\frac{A}{x-3} + \frac{B}{x^2+3} + \frac{C}{(x^2+3)^2}$	(D) $\frac{A}{x-3} + \frac{Bx+C}{x^2+3} + \frac{Dx+E}{(x^2+3)^2}$

Q20.

By using long division, we have $\frac{x^4-4x^3+3x^2+7x-4}{x^3-3x^2+4} =$

(A)	(B)	(C)	(D)
$x+1+\frac{3x}{x^3-3x^2+4}$	$x+\frac{3x}{x^3-3x^2+4}$	$x-1+\frac{3x}{x^3-3x^2+4}$	$1-x+\frac{3x}{x^3-3x^2+4}$

Q21.

The form of the partial fraction decomposition of the remainder is $\frac{3x}{x^3-3x^2+4} = \frac{3x}{(x-2)^2(x+1)} = \frac{A}{x-2} + \frac{B}{(x-2)^2} + \frac{C}{x+1}$. Solving for $A, B,$ and $C,$ we get

(A)	(B)	(C)	(D)
$A=-\frac{1}{3}, B=2, C=\frac{1}{3}$	$A=\frac{1}{3}, B=2, C=-\frac{1}{3}$	$A=-\frac{1}{3}, B=2, C=-\frac{1}{3}$	$A=\frac{1}{3}, B=2, C=\frac{1}{3}$

Q22.

$$\int \frac{x^4-4x^3+3x^2+7x-4}{x^3-3x^2+4}\,dx =$$

(A)	(B)
$\frac{x^2}{2}+x+\frac{1}{3}\ln\lvert x-2\rvert-\frac{2}{x-2}+\frac{1}{3}\ln\lvert x+1\rvert+C$	$\frac{x^2}{2}-\frac{1}{3}\ln\lvert x-2\rvert-\frac{2}{x-2}+\frac{1}{3}\ln\lvert x+1\rvert+C$
(C)	(D)
$\frac{x^2}{2}-x+\frac{1}{3}\ln\lvert x-2\rvert-\frac{2}{x-2}-\frac{1}{3}\ln\lvert x+1\rvert+C$	$x-\frac{x^2}{2}-\frac{1}{3}\ln\lvert x-2\rvert-\frac{2}{x-2}-\frac{1}{3}\ln\lvert x+1\rvert+C$

Q23.

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

(A)	(B)	(C)	(D)	(E)
$\sin^{-1}(e^x)+C$	$\tan^{-1}(e^x)+C$	$\frac{e^{x+1}}{x+1}+C$	$\frac{2e^{x+1}}{x+1}+C$	$\frac{(2x)e^{x+1}}{x+1}+C$

السؤال رقم 24 هو تكرار للسؤال رقم 23 و يجب أن تجيب عليه للحصول على درجته

Q24.

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

(A)	(B)	(C)	(D)	(E)
$\sin^{-1}(e^x)+C$	$\tan^{-1}(e^x)+C$	$\frac{e^{x+1}}{x+1}+C$	$\frac{2e^{x+1}}{x+1}+C$	$\frac{(2x)e^{x+1}}{x+1}+C$

Q25.

$$\int \frac{dx}{\sqrt{6x - x^2}} =$$

Hint: complete the square.

(A)	(B)	(C)	(D)	(E)
$\sin^{-1}\left(\frac{x-3}{3}\right) + C$	$\tan^{-1}\left(\frac{x-3}{3}\right) + C$	$\sin^{-1}(x-3) + C$	$\tan^{-1}(x-3) + C$	$\frac{1}{\sqrt{6x}} + \sin^{-1} x + C$

السؤال رقم 26 هو تكرار للسؤال رقم 25 و يجب أن تجيب عليه للحصول على درجته

Q26.

$$\int \frac{dx}{\sqrt{6x - x^2}} =$$

Hint: complete the square.

(A)	(B)	(C)	(D)	(E)
$\sin^{-1}\left(\frac{x-3}{3}\right) + C$	$\tan^{-1}\left(\frac{x-3}{3}\right) + C$	$\sin^{-1}(x-3) + C$	$\tan^{-1}(x-3) + C$	$\frac{1}{\sqrt{6x}} + \sin^{-1} x + C$

Q27.

$$\int \cot x \; dx =$$

(A)	(B)	(C)
$-\csc^2 x + C$	$\frac{\cot^2 x}{2} + C$	$\ln\lvert\sec x\rvert + C$
(D) $\ln\lvert\csc x - \cot x\rvert + C$	(E) $\ln\lvert\sin x\rvert + C$	

السؤال رقم 28 هو تكرار للسؤال رقم 27 و يجب أن تجيب عليه للحصول على درجته

Q28.

$$\int \cot x \; dx =$$

(A)	(B)	(C)
$-\csc^2 x + C$	$\frac{\cot^2 x}{2} + C$	$\ln\lvert\sec x\rvert + C$
(D) $\ln\lvert\csc x - \cot x\rvert + C$	(E) $\ln\lvert\sin x\rvert + C$	

Q29.

$$\int e^{2\theta} \sin 3\theta \; d\theta =$$

(A)	(B)
$\frac{1}{9}\sin^3 x \,[3\ln(\sin x) - 1] + C$	$\frac{3}{13}e^{2\theta}\sin 3\theta - \frac{2}{13}e^{2\theta}\cos 3\theta + C$
(C) $\frac{1}{6}\sin^3 x \,[6\ln(\sin x) - 1] + C$	(D) $\frac{2}{13}e^{2\theta}\sin 3\theta - \frac{3}{13}e^{2\theta}\cos 3\theta + C$
(E) $\frac{\sin^4 3\theta}{4} \cdot \frac{e^{3\theta}}{3} + C$	

السؤال رقم 30 هو تكرار للسؤال رقم 29 و يجب أن تجيب عليه للحصول على درجته

Q30. $\int e^{2\theta} \sin 3\theta \ d\theta =$	
(A) $\frac{1}{9}\sin^3 x \,[3\ln(\sin x) - 1] + C$	(B) $\frac{3}{13}e^{2\theta}\sin 3\theta - \frac{2}{13}e^{2\theta}\cos 3\theta + C$
(C) $\frac{1}{6}\sin^3 x \,[6\ln(\sin x) - 1] + C$	(D) $\frac{2}{13}e^{2\theta}\sin 3\theta - \frac{3}{13}e^{2\theta}\cos 3\theta + C$
(E) $\frac{\sin^4 3\theta}{4} \cdot \frac{e^{3\theta}}{3} + C$	

C

Answers to the second exam

16 / 1 / 1433H

C

1	D
2	D
3	C
4	C
5	B
6	B
7	E
8	E
9	D
10	B
11	A
12	A
13	D
14	C
15	D
16	A
17	B
18	A
19	D
20	C
21	B
22	C
23	B
24	B
25	A
26	A
27	E
28	E
29	D
30	D