جامعة الملك عبدالعزيز.

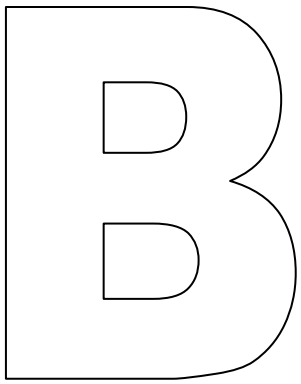
كلية العلوم. الاسم:_____

قسم الرياضيات. الرقم الجامعي:_____

math 202.
Calculus 2.

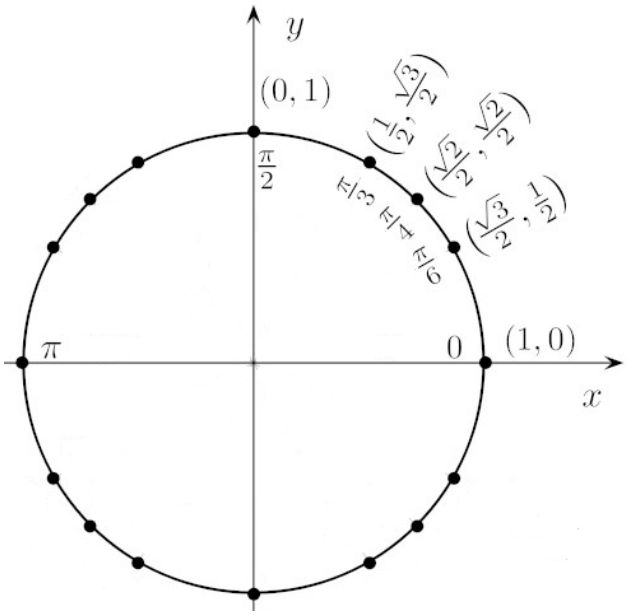
Second Exam

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



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

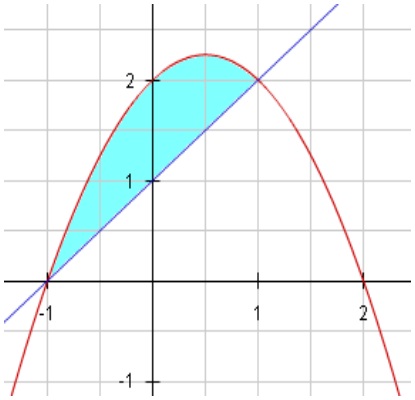


The Unit Circle

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

Q1.

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



(A)	(B)	(C)	(D)	(E)
$\frac{2}{3}$	$\frac{4}{3}$	$\frac{5}{3}$	$\frac{7}{3}$	$\frac{8}{3}$

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

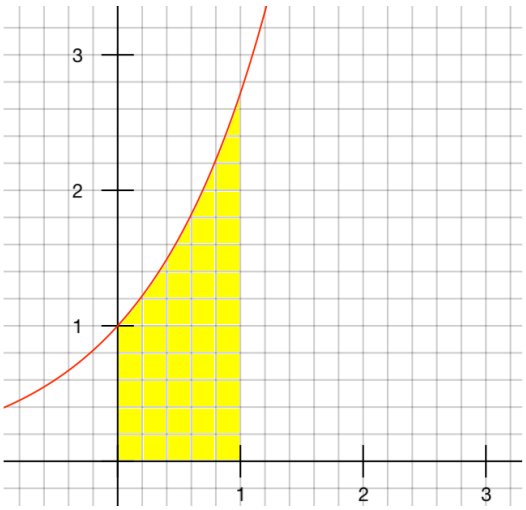
Q2.

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

(A)	(B)	(C)	(D)	(E)
$\frac{2}{3}$	$\frac{4}{3}$	$\frac{5}{3}$	$\frac{7}{3}$	$\frac{8}{3}$

Q3.

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



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

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

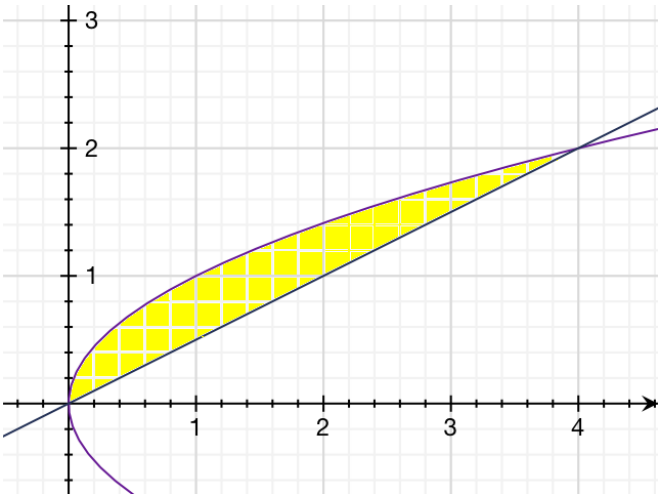
Q4.

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

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

Q5.

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



(A)	(B)	(C)	(D)	(E)
$\frac{64}{15}\pi$	$\frac{63}{15}\pi$	$\frac{62}{15}\pi$	$\frac{61}{15}\pi$	$\frac{59}{15}\pi$

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

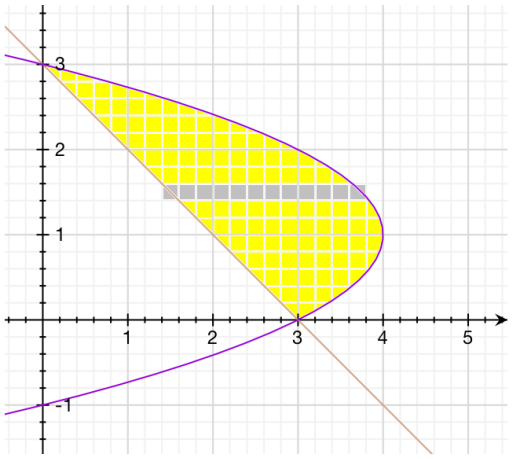
Q6.

The volume of the solid obtained by rotating the region bounded by the curve $x = y^2$ and the line $x = 2y$, about the y-axis

(A)	(B)	(C)	(D)	(E)
$\frac{64}{15}\pi$	$\frac{63}{15}\pi$	$\frac{62}{15}\pi$	$\frac{61}{15}\pi$	$\frac{59}{15}\pi$

Q7.

The volume of the solid obtained by rotating the region bounded by the curve $x = 4 - (y-1)^2$ and the line $x = 3 - y$ about the x-axis is



(A)	(B)	(C)	(D)	(E)
$\frac{23}{2}\pi$	$\frac{25}{2}\pi$	$\frac{27}{2}\pi$	$\frac{29}{2}\pi$	$\frac{31}{2}\pi$

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 $x = 4 - (y-1)^2$ and the line $x = 3 - y$ about the x-axis is

(A)	(B)	(C)	(D)	(E)
$\frac{23}{2}\pi$	$\frac{25}{2}\pi$	$\frac{27}{2}\pi$	$\frac{29}{2}\pi$	$\frac{31}{2}\pi$

Q9.

$$\int x \cos 4x \, dx =$$

(A)	(B)
$\frac{1}{4}x \sin 4x + \frac{1}{16}\cos 4x + C$	$\frac{1}{16}x \sin 4x + \frac{1}{4}\cos 4x + C$
(C)	(D)
$\frac{1}{4}x \sin 4x + \frac{1}{4}\cos 4x + C$	$\frac{1}{16}x \sin 4x + \frac{1}{16}\cos 4x + C$

Q10.

$$\int \ln(7x) \, dx =$$

(A)	(B)	(C)	(D)
$x\ln(7x) + x + C$	$x\ln(7x) - 7x + C$	$x\ln(7x) - x + C$	$\frac{1}{7}x\ln(7x) - x + C$

Q11. $\int \sin^3 x \ \cos^2 x \, dx =$	
(A) $5\cos^5 x - 3\cos^3 x + C$	(B) $5\cos^5 x - \frac{1}{3}\cos^3 x + C$
(C) $\frac{1}{5}\cos^5 x - 3\cos^3 x + C$	(D) $\frac{1}{5}\cos^5 x + \frac{1}{3}\cos^3 x + C$
(E) $\frac{1}{5}\cos^5 x - \frac{1}{3}\cos^3 x + C$	

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

Q12. $\int \sin^3 x \ \cos^2 x \, dx =$	
(A) $5\cos^5 x - 3\cos^3 x + C$	(B) $5\cos^5 x - \frac{1}{3}\cos^3 x + C$
(C) $\frac{1}{5}\cos^5 x - 3\cos^3 x + C$	(D) $\frac{1}{5}\cos^5 x + \frac{1}{3}\cos^3 x + C$
(E) $\frac{1}{5}\cos^5 x - \frac{1}{3}\cos^3 x + C$	

Q13. $\int \tan^3 x \ \sec^4 x \ dx =$			
(A) $\frac{1}{4}\tan^4 x + \frac{1}{5}\tan^5 x + C$	(B) $\frac{1}{4}\tan^4 x + \frac{1}{6}\tan^6 x + C$	(C) $\frac{1}{4}\tan^4 x + \frac{1}{6}\sec^6 x + C$	(D) $\frac{1}{4}\tan^4 x - \frac{1}{6}\tan^6 x + C$

Q14. $\int \sin 8x \ \cos 5x \ dx =$	
(A) $-\frac{1}{6}\sin 3x - \frac{1}{26}\cos 13x + C$	(B) $-\frac{1}{6}\cos 3x - \frac{1}{26}\sin 13x + C$
(C) $-\frac{1}{6}\sin 3x - \frac{1}{26}\sin 13x + C$	(D) $-\frac{1}{6}\cos 3x - \frac{1}{26}\cos 13x + C$

Q15.

To evaluate $\int \frac{\sqrt{16-x^2}}{x^2}\,dx$ using Trigonometric substitution, we let

(A) $x = 4\cosh\theta,\ 0 \le \theta < \infty$

(B) $x = 4\sec\theta,\ 0 \le \theta < \frac{\pi}{2}$ or $\pi \le \theta < \frac{3\pi}{2}$

(C) $x = 4\sin\theta,\ -\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$

(D) $x = 4\tan\theta,\ -\frac{\pi}{2} < \theta < \frac{\pi}{2}$

Q16.

$$\int \frac{\sqrt{16-x^2}}{x^2}\,dx =$$

(A) $\frac{\sqrt{16-x^2}}{x} - \tan^{-1}\left(\frac{x}{4}\right) + C$

(B) $\frac{\sqrt{16-x^2}}{x} - \sin^{-1}\left(\frac{x}{4}\right) + C$

(C) $-\frac{\sqrt{16-x^2}}{x} - \tan^{-1}\left(\frac{x}{4}\right) + C$

(D) $-\frac{\sqrt{16-x^2}}{x} - \sin^{-1}\left(\frac{x}{4}\right) + C$

Q17.

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

(A) $x = 2\sec\theta,\ 0 \le \theta < \frac{\pi}{2}$ or $\pi \le \theta < \frac{3\pi}{2}$

(B) $x = 2\cosh\theta$

(C) $x = 2\tan\theta,\ -\frac{\pi}{2} < \theta < \frac{\pi}{2}$

(D) $x = 2\sin\theta,\ -\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$

Q18.

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

(A) $\frac{(x^2-4)^{\frac{1}{2}}}{6x^3} + C$

(B) $\frac{(x^2-4)^{\frac{1}{2}}}{12x^3} + C$

(C) $\frac{(x^2-4)^{\frac{3}{2}}}{6x^3} + C$

(D) $\frac{(x^2-4)^{\frac{3}{2}}}{12x^3} + C$

Q19.

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

(A) $\frac{Ax+B}{x-2} + \frac{Cx+D}{x^2+1} + \frac{Ex+F}{(x^2+1)^2}$

(B) $\frac{A}{x-2} + \frac{Bx+C}{x^2+1} + \frac{Dx+E}{(x^2+1)^2}$

(C) $\frac{A}{x-2} + \frac{Bx+C}{(x^2+1)^2}$

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

Q20.

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

(A)	(B)	(C)	(D)
$x-1+\frac{5x}{x^3-3x+2}$	$x+1+\frac{5x}{x^3-3x+2}$	$1-x+\frac{5x}{x^3-3x+2}$	$x+\frac{5x}{x^3-3x+2}$

Q21.

The form of the partial fraction decomposition of the remainder is $\frac{5x}{x^3-3x+2} = \frac{5x}{(x-1)^2(x+2)} = \frac{A}{x-1}+\frac{B}{(x-1)^2}+\frac{C}{x+2}$. Solving for $A, B,$ and $C,$ we get

(A)	(B)	(C)	(D)
$A=-\frac{10}{9}, B=\frac{5}{3}, C=-\frac{10}{9}$	$A=\frac{10}{9}, B=\frac{5}{3}, C=\frac{10}{9}$	$A=\frac{10}{9}, B=\frac{5}{3}, C=-\frac{10}{9}$	$A=-\frac{10}{9}, B=\frac{5}{3}, C=\frac{10}{9}$

Q22.

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

(A)	(B)
$\frac{x^2}{2}+x+\frac{10}{9}\ln\lvert x-1\rvert-\frac{5}{3}\cdot\frac{1}{x-1}-\frac{10}{9}\ln\lvert x+2\rvert+C$	$\frac{x^2}{2}+\frac{10}{9}\ln\lvert x-1\rvert-\frac{5}{3}\cdot\frac{1}{x-1}-\frac{10}{9}\ln\lvert x+2\rvert+C$
(C)	(D)
$x-\frac{x^2}{2}+\frac{10}{9}\ln\lvert x-1\rvert-\frac{5}{3}\cdot\frac{1}{x-1}-\frac{10}{9}\ln\lvert x+2\rvert+C$	$\frac{x^2}{2}-x+\frac{10}{9}\ln\lvert x-1\rvert-\frac{5}{3}\cdot\frac{1}{x-1}-\frac{10}{9}\ln\lvert x+2\rvert+C$

Q23.

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

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

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

Q24.

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

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

Q25.

$$\int \frac{dx}{\sqrt{8x-x^2}} =$$

Hint: complete the square.

(A)	(B)	(C)	(D)	(E)
$\frac{1}{\sqrt{8x}}+\tan^{-1}x+C$	$\sin^{-1}(x-4)+C$	$\tan^{-1}(x-4)+C$	$\sin^{-1}\left(\frac{x-4}{4}\right)+C$	$\tan^{-1}\left(\frac{x-4}{4}\right)+C$

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

Q26. $\int \frac{dx}{\sqrt{8x - x^2}} =$ Hint: complete the square.				
(A) $\frac{1}{\sqrt{8x}} + \tan^{-1} x + C$	(B) $\sin^{-1}(x-4) + C$	(C) $\tan^{-1}(x-4) + C$	(D) $\sin^{-1}\left(\frac{x-4}{4}\right) + C$	(E) $\tan^{-1}\left(\frac{x-4}{4}\right) + C$

Q27. $\int \sec x \ dx =$		
(A) $\frac{\sec^2 x}{2} + C$	(B) $\ln\lvert\sec x + \tan x\rvert + C$	(C) $\ln\lvert\csc x - \cot x\rvert + C$
(D) $\sec x \ \tan x + C$	(E) $\ln\lvert\sin x\rvert + C$	

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

Q28. $\int \sec x \ dx =$		
(A) $\frac{\sec^2 x}{2} + C$	(B) $\ln\lvert\sec x + \tan x\rvert + C$	(C) $\ln\lvert\csc x - \cot x\rvert + C$
(D) $\sec x \ \tan x + C$	(E) $\ln\lvert\sin x\rvert + C$	

Q29. $\int \frac{3x}{\sqrt{3-2x}} \ dx =$	
(A) $-(x+3)\sqrt{3-2x} \ + C$	(B) $(-x+3)\sqrt{3-2x} \ + C$
(C) $-(x+3)\sqrt{2x-3} \ + C$	(D) $\frac{1}{3x} + \frac{2}{9}\ln\left\lvert\frac{2x-3}{x}\right\rvert + C$
(E) $\frac{1}{3x} + \frac{4}{9}\ln\left\lvert\frac{2x-3}{x}\right\rvert + C$	

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

Q30. $\int \frac{3x}{\sqrt{3-2x}}\, dx =$	
(A) $-(x+3)\sqrt{3-2x} + C$	(B) $(-x+3)\sqrt{3-2x} + C$
(C) $-(x+3)\sqrt{2x-3} + C$	(D) $\frac{1}{3x} + \frac{2}{9}\ln\left\lvert\frac{2x-3}{x}\right\rvert + C$
(E) $\frac{1}{3x} + \frac{4}{9}\ln\left\lvert\frac{2x-3}{x}\right\rvert + C$	

B

Answers to the second exam

16 / 1 / 1433H

B

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