جامعة الملك عبد العزيز.

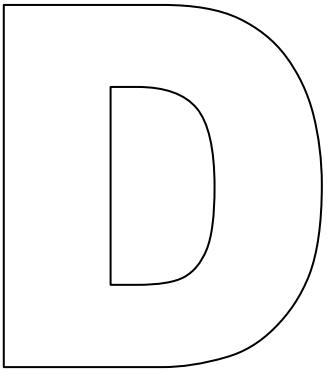
كلية العلوم. الاسم:_____

قسم الرياضيات. الرقم الجامعي:_____

math 202.
Calculus 2.

Final Exam

Date: Monday 4 / 7 / 1432.
Time: from 08:00 to 10:00.



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

Q1.

$\sum_{k=1}^{50}(4k+2) =$

(A)	(B)	(C)	(D)	(E)
5000	5102	51998	5200	52000

Q2.

If k is even on $\mathbb{R}$ and $\int_{-1}^{1} k(x)dx = \frac{\sqrt{5}}{3}$, then $\int_{0}^{1} k(x)dx =$

(A)	(B)	(C)	(D)
$\frac{\sqrt{5}}{4}$	$\frac{\sqrt{5}}{6}$	$\frac{\sqrt{5}}{12}$	$\frac{\sqrt{5}}{2}$

Q3.

$\frac{d}{dx}\left(\int_{1}^{x} \frac{\operatorname{csch}^{-1} t}{t} dt\right) =$

(A)	(B)	(C)	(D)
$-\frac{1}{\lvert x\rvert\sqrt{1+x^2}}$	$-\frac{1}{\lvert x\rvert\sqrt{1+x}}$	$\frac{\operatorname{csch}^{-1} x}{x}$	$\frac{\csc^{-1} x}{x}$

Q4.

If $f(x) > 1$ for all $x \in [a\,, b]$, then the area of the region bounded by the graph of f, the x-axis, and the vertical lines $x = a$ and $x = b$ is $\int_{a}^{b} f(x)dx$.

(A)	(B)
T R U E	F A L S E

Q5.

$$\int \frac{12x^5+6x^2-2}{\sqrt[5]{x^6+x^3-x}}\, dx =$$

(A)	(B)
$\frac{5}{2}\sqrt[5]{(x^6+x^3-x)^4} + C$	$\frac{5}{2}\sqrt[4]{(x^6+x^3-x)^5} + C$
(C)	(D)
$\frac{5}{4}\sqrt[5]{(x^6+x^3-x)^4} + C$	$\frac{5}{4}\sqrt[4]{(x^6+x^3-x)^5} + C$

Q6.

The area of the region bounded by the graph of $y = \frac{1}{1+x^2}$ and the x-axis over the closed interval $\left[\frac{\sqrt{3}}{3}\,, \sqrt{3}\right]$ is

(A)	(B)	(C)	(D)
$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{\pi}{12}$	$\frac{\pi}{6}$

D

السؤال رقم 7 هو تكرار للسؤال رقم 6 و يجب أن تجيب عليه للحصول على درجته

Q6.

The area of the region bounded by the graph of $y = \frac{1}{1+x^2}$ and the x-axis over the closed interval $\left[\frac{\sqrt{3}}{3}, \sqrt{3}\right]$ is

(A) $\frac{\pi}{4}$	(B) $\frac{\pi}{2}$	(C) $\frac{\pi}{12}$	(D) $\frac{\pi}{6}$

Q8.

The area between the curves $f(x) = x^5$ and $g(x) = x^6$ is

(A) $\frac{1}{20}$	(B) $\frac{1}{42}$	(C) $\frac{1}{24}$	(D) $\frac{3}{42}$	(E) $\frac{5}{24}$

السؤال رقم 9 هو تكرار للسؤال رقم 8 و يجب أن تجيب عليه للحصول على درجته

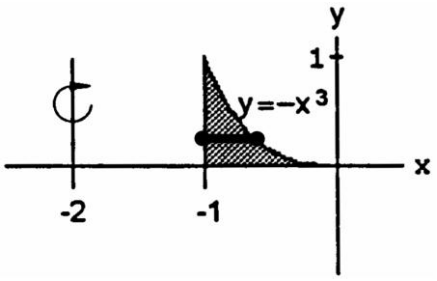
Q9.

The area between the curves $f(x) = x^5$ and $g(x) = x^6$ is

(A) $\frac{1}{20}$	(B) $\frac{1}{42}$	(C) $\frac{1}{24}$	(D) $\frac{3}{42}$	(E) $\frac{5}{24}$

Q10.

The volume of the solid generated by revolving the region in the second quadrant bounded by the curve $y = -x^3$, the x-axis, and the line $x = -1$, about the line $x = -2$ is



Hint: $R(y) = 2 - \sqrt[3]{y}$ and $r(y) = 1$.

(A) $\frac{4\pi}{5}$	(B) $\frac{\pi}{5}$	(C) $\frac{6\pi}{5}$	(D) $\frac{2\pi}{5}$	(E) $\frac{3\pi}{5}$

السؤال رقم 11 هو تكرار للسؤال رقم 10 و يجب أن تجيب عليه للحصول على درجته

Q11.

The volume of the solid generated by revolving the region in the second quadrant bounded by the curve $y = -x^3$, the x-axis, and the line $x = -1$, about the line $x = -2$ is

(A) $\frac{4\pi}{5}$	(B) $\frac{\pi}{5}$	(C) $\frac{6\pi}{5}$	(D) $\frac{2\pi}{5}$	(E) $\frac{3\pi}{5}$

D

Q12.

The length of the curve $y = \ln \sin x$ over $\left[\frac{\pi}{6}, \frac{\pi}{2}\right]$ is

(A) $\ln(\sqrt{3}+2)$	(B) $\ln\sqrt{3}$	(C) $\sqrt{3}$	(D) $\ln\left(\frac{\sqrt{3}+2}{2}\right)$	(E) $\sqrt{3}+2$

السؤال رقم 13 هو تكرار للسؤال رقم 12 و يجب أن تجيب عليه للحصول على درجته

Q13.

The length of the curve $y = \ln \sin x$ over $\left[\frac{\pi}{6}, \frac{\pi}{2}\right]$ is

(A) $\ln(\sqrt{3}+2)$	(B) $\ln\sqrt{3}$	(C) $\sqrt{3}$	(D) $\ln\left(\frac{\sqrt{3}+2}{2}\right)$	(E) $\sqrt{3}+2$

Q14.

If $f(x) = x^2 + x - 2\ ;\ x \geq -\frac{1}{2}$, then $(f^{-1})'(0) =$

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

Q15.

If $f(x) = x^3 + 1$, then $f^{-1}(x) =$

(A) $\sqrt[3]{x}\ + 1$	(B) $\sqrt[3]{x+1}$	(C) $\sqrt[3]{x-1}$	(D) $\frac{1}{x^3} - 1$

Q16.

If $y = \frac{(x^2+1)(e^x)(\cosh x)}{\sqrt{x^4+2}}$, then $y' = \frac{dy}{dx} =$

(A) $\left(\frac{(x^2+1)(e^x)(\cosh x)}{\sqrt{x^4+2}}\right)\left(\frac{2x}{x^2+1} + 1 + \coth x - \frac{2x^3}{x^4+2}\right)$	(B) $\left(\frac{(x^2+1)(e^x)(\cosh x)}{\sqrt{x^4+2}}\right)\left(\frac{2x}{x^2+1} + 1 + \coth x + \frac{4x^3}{x^4+2}\right)$
(C) $\left(\frac{(x^2+1)(e^x)(\cosh x)}{\sqrt{x^4+2}}\right)\left(\frac{2x}{x^2+1} + 1 + \tanh x + \frac{4x^3}{x^4+2}\right)$	(D) $\left(\frac{(x^2+1)(e^x)(\cosh x)}{\sqrt{x^4+2}}\right)\left(\frac{2x}{x^2+1} + 1 + \tanh x - \frac{2x^3}{x^4+2}\right)$
(E) $\left(\frac{(x^2+1)(e^x)(\cosh x)}{\sqrt{x^4+2}}\right)\left(\frac{2x}{x^2+1} + 1 + \tanh x + \frac{2x^3}{x^4+2}\right)$	

السؤال رقم 17 هو تكرار للسؤال رقم 16 و يجب أن تجيب عليه للحصول على درجته

Q17.

If $y = \frac{(x^2+1)(e^x)(\cosh x)}{\sqrt{x^4+2}}$, then $y' = \frac{dy}{dx} =$

(A) $\left(\frac{(x^2+1)(e^x)(\cosh x)}{\sqrt{x^4+2}}\right)\left(\frac{2x}{x^2+1} + 1 + \coth x - \frac{2x^3}{x^4+2}\right)$	(B) $\left(\frac{(x^2+1)(e^x)(\cosh x)}{\sqrt{x^4+2}}\right)\left(\frac{2x}{x^2+1} + 1 + \coth x + \frac{4x^3}{x^4+2}\right)$
(C) $\left(\frac{(x^2+1)(e^x)(\cosh x)}{\sqrt{x^4+2}}\right)\left(\frac{2x}{x^2+1} + 1 + \tanh x + \frac{4x^3}{x^4+2}\right)$	(D) $\left(\frac{(x^2+1)(e^x)(\cosh x)}{\sqrt{x^4+2}}\right)\left(\frac{2x}{x^2+1} + 1 + \tanh x - \frac{2x^3}{x^4+2}\right)$
(E) $\left(\frac{(x^2+1)(e^x)(\cosh x)}{\sqrt{x^4+2}}\right)\left(\frac{2x}{x^2+1} + 1 + \tanh x + \frac{2x^3}{x^4+2}\right)$	

D

Q18. If $x > 1$, then $\frac{d}{dx}\left(3^{\csc^{-1}x}\right) =$			
(A) $-\frac{3^{\csc^{-1}x}\ \ln 3}{x\sqrt{x^2+1}}$	(B) $-\frac{3^{\csc^{-1}x}}{x\sqrt{x^2-1}}$	(C) $-\frac{\ln 3}{3^{\csc x}\cdot x\cdot\sqrt{x^2-1}}$	(D) $-\frac{3^{\csc^{-1}x}\ \ln 3}{x\sqrt{x^2-1}}$

Q19. $\lim_{x\to\infty} x^{\frac{1}{x}} =$			
(A) 1	(B) 0	(C) e	(D) 1

Q20. $\lim_{x\to\infty} \csc^{-1} x =$			
(A) 0	(B) e	(C) 1	(D) ∞

Q21. $\int \frac{1}{(x-2)\sqrt{x^2-4x+3}}dx =$ Hint: complete the square				
(A) $\sin^{-1}\frac{\lvert x-2\rvert}{2}+C$	(B) $\sec^{-1}\lvert x-2\rvert+C$	(C) $\frac{1}{2}\sec^{-1}\lvert x-2\rvert+C$	(D) $\sec^{-1}\frac{\lvert x-2\rvert}{2}+C$	(E) $\sin^{-1}\lvert x-2\rvert+C$

السؤال رقم 22 هو تكرار للسؤال رقم 21 و يجب أن تجيب عليه للحصول على درجته

Q22. $\int \frac{1}{(x-2)\sqrt{x^2-4x+3}}dx =$				
(A) $\sin^{-1}\frac{\lvert x-2\rvert}{2}+C$	(B) $\sec^{-1}\lvert x-2\rvert+C$	(C) $\frac{1}{2}\sec^{-1}\lvert x-2\rvert+C$	(D) $\sec^{-1}\frac{\lvert x-2\rvert}{2}+C$	(E) $\sin^{-1}\lvert x-2\rvert+C$

Q23.			
(A)	(B)	(C)	(D)

Q24.			
(A)	(B)	(C)	(D)

Q25.			
(A)	(B)	(C)	(D)

D

Q26. $\int \frac{x+2}{x^3-4x^2-5x}dx =$ Hint: use Heaviside cover method.	
(A) $-\frac{2}{5}\ln\|x\|-\frac{7}{6}\ln\|x+1\|-\frac{7}{30}\ln\|x-5\|+C$	(B) $-\frac{2}{5}\ln\|x\|+\frac{1}{6}\ln\|x+1\|-\frac{7}{30}\ln\|x-5\|+C$
(C) $-\frac{2}{5}\ln\|x\|-\frac{7}{6}\ln\|x+1\|+\frac{7}{30}\ln\|x-5\|+C$	(D) $-\frac{2}{5}\ln\|x\|+\frac{1}{6}\ln\|x+1\|+\frac{7}{30}\ln\|x-5\|+C$
(E) $\frac{2}{5}\ln\|x\|+\frac{7}{6}\ln\|x+1\|+\frac{7}{30}\ln\|x-5\|+C$	

السؤال رقم 27 هو تكرار للسؤال رقم 26 و يجب أن تجيب عليه للحصول على درجته

Q27. $\int \frac{x+2}{x^3-4x^2-5x}dx =$	
(A) $-\frac{2}{5}\ln\|x\|-\frac{7}{6}\ln\|x+1\|-\frac{7}{30}\ln\|x-5\|+C$	(B) $-\frac{2}{5}\ln\|x\|+\frac{1}{6}\ln\|x+1\|-\frac{7}{30}\ln\|x-5\|+C$
(C) $-\frac{2}{5}\ln\|x\|-\frac{7}{6}\ln\|x+1\|+\frac{7}{30}\ln\|x-5\|+C$	(D) $-\frac{2}{5}\ln\|x\|+\frac{1}{6}\ln\|x+1\|+\frac{7}{30}\ln\|x-5\|+C$
(E) $\frac{2}{5}\ln\|x\|+\frac{7}{6}\ln\|x+1\|+\frac{7}{30}\ln\|x-5\|+C$	

Q28. $\int \csc^3 x\,dx =$	
(A) $-\frac{1}{2}(\csc x\cot x+\ln\|\csc x-\cot x\|)+C$	(B) $\frac{1}{2}(\csc x\cot x+\ln\|\csc x-\cot x\|)+C$
(C) $-\frac{1}{2}(\csc x\cot x-\ln\|\csc x+\cot x\|)+C$	(D) $\frac{1}{2}(\csc x\cot x+\ln\|\csc x+\cot x\|)+C$
(E) $-\frac{1}{2}(\csc x\cot x+\ln\|\csc x+\cot x\|)+C$	

السؤال رقم 29 هو تكرار للسؤال رقم 28 و يجب أن تجيب عليه للحصول على درجته

Q29. $\int \csc^3 x\,dx =$	
(A) $-\frac{1}{2}(\csc x\cot x+\ln\|\csc x-\cot x\|)+C$	(B) $\frac{1}{2}(\csc x\cot x+\ln\|\csc x-\cot x\|)+C$
(C) $-\frac{1}{2}(\csc x\cot x-\ln\|\csc x+\cot x\|)+C$	(D) $\frac{1}{2}(\csc x\cot x+\ln\|\csc x+\cot x\|)+C$
(E) $-\frac{1}{2}(\csc x\cot x+\ln\|\csc x+\cot x\|)+C$	

Q30.

$$\int \sin 5x \cos 3x \, dx =$$

(A) $-\frac{\cos 2x}{2} - \frac{\cos 8x}{8} + C$	(B) $\frac{\cos 2x}{2} + \frac{\cos 8x}{8} + C$
(C) $-\frac{\cos 2x}{4} - \frac{\cos 8x}{16} + C$	(D) $-\frac{\cos 2x}{4} + \frac{\cos 8x}{16} + C$
(E) $\frac{\cos 2x}{4} + \frac{\cos 8x}{16} + C$	

Q31.

$$\int \sqrt{1-9x^2} \, dx =$$

(A) $\frac{\sin^{-1}(3x)}{6} + \frac{x\sqrt{1-9x^2}}{2} + C$	(B) $\frac{\sin^{-1}(3x)}{6} - \frac{x\sqrt{1-9x^2}}{2} + C$	(C) $\frac{\sinh^{-1}(3x)}{3} + \frac{x\sqrt{1-9x^2}}{2} + C$
(D) $\frac{\sin^{-1}(3x)}{3} + \frac{x\sqrt{1-9x^2}}{2} + C$	(E) $\frac{\sinh^{-1}(3x)}{6} + \frac{x\sqrt{1-9x^2}}{2} + C$	

السؤال رقم 32 هو تكرار للسؤال رقم 31 و يجب أن تجيب عليه للحصول على درجته

Q32.

$$\int \sqrt{1-9x^2} \, dx =$$

(A) $\frac{\sin^{-1}(3x)}{6} + \frac{x\sqrt{1-9x^2}}{2} + C$	(B) $\frac{\sin^{-1}(3x)}{6} - \frac{x\sqrt{1-9x^2}}{2} + C$	(C) $\frac{\sinh^{-1}(3x)}{3} + \frac{x\sqrt{1-9x^2}}{2} + C$
(D) $\frac{\sin^{-1}(3x)}{3} + \frac{x\sqrt{1-9x^2}}{2} + C$	(E) $\frac{\sinh^{-1}(3x)}{6} + \frac{x\sqrt{1-9x^2}}{2} + C$	

Q33.

If $x > 5$, then $\int \frac{\sqrt{x^2-25}}{x^3} \, dx =$

(A) $\frac{\sin^{-1}\left(\frac{x}{5}\right)}{5} - \frac{\sqrt{x^2-25}}{2x^2} + C$	(B) $\frac{\sin^{-1}\left(\frac{x}{5}\right)}{10} + \frac{\sqrt{x^2-25}}{2x^2} + C$	(C) $\frac{\sec^{-1}\left(\frac{x}{5}\right)}{5} - \frac{\sqrt{x^2-25}}{x^2} + C$
(D) $\frac{\sec^{-1}\left(\frac{x}{5}\right)}{10} - \frac{\sqrt{x^2-25}}{2x^2} + C$	(E) $\frac{\sec^{-1}\left(\frac{x}{5}\right)}{5} + \frac{\sqrt{x^2-25}}{2x^2} + C$	

السؤال رقم 34 هو تكرار للسؤال رقم 33 و يجب أن تجيب عليه للحصول على درجته

Q34.

If $x > 5$, then $\int \frac{\sqrt{x^2-25}}{x^3} \, dx =$

(A) $\frac{\sin^{-1}\left(\frac{x}{5}\right)}{5} - \frac{\sqrt{x^2-25}}{2x^2} + C$	(B) $\frac{\sin^{-1}\left(\frac{x}{5}\right)}{10} + \frac{\sqrt{x^2-25}}{2x^2} + C$	(C) $\frac{\sec^{-1}\left(\frac{x}{5}\right)}{5} - \frac{\sqrt{x^2-25}}{x^2} + C$
(D) $\frac{\sec^{-1}\left(\frac{x}{5}\right)}{10} - \frac{\sqrt{x^2-25}}{2x^2} + C$	(E) $\frac{\sec^{-1}\left(\frac{x}{5}\right)}{5} + \frac{\sqrt{x^2-25}}{2x^2} + C$	

Q35.

$$\int \frac{dx}{5-5\sin 2x} =$$

(A)	(B)	(C)	(D)
$\frac{1}{10}\tan\left(\frac{\pi}{4}+\frac{x}{2}\right)+C$	$\frac{1}{6}\tan\left(\frac{\pi}{4}+\frac{x}{2}\right)+C$	$\frac{1}{2}\tan\left(\frac{\pi}{4}+x\right)+C$	$\frac{1}{10}\tan\left(\frac{\pi}{4}+x\right)+C$

Q36.

$$\int_{-1}^{3} \frac{5}{x-1}\, dx =$$

(A)	(B)	(C)	(D)
It is a divergent improper integral	0	$5\ln 2$	$10\ln 2$

السؤال رقم 37 هو تكرار للسؤال رقم 36 و يجب أن تجيب عليه للحصول على درجته

Q37.

$$\int_{-1}^{3} \frac{5}{x-1}\, dx =$$

(A)	(B)	(C)	(D)
It is a divergent improper integral	0	$5\ln 2$	$10\ln 2$

Q38.

The improper integral $\int_{2}^{\infty} \frac{x+3}{(x-1)(x^2+1)}\, dx$ converges to

(Hint: Use partial fractions method.)

(A)	(B)	(C)	(D)
$\frac{\pi}{2}+\ln 5+\tan^{-1}2$	$-\frac{\pi}{2}+\ln 5+\tan^{-1}2$	$-\frac{\pi}{2}-\ln 5+\tan^{-1}2$	$-\frac{\pi}{2}+\ln 5-\tan^{-1}2$

السؤال رقم 39 هو تكرار للسؤال رقم 38 و يجب أن تجيب عليه للحصول على درجته

Q39.

The improper integral $\int_{2}^{\infty} \frac{x+3}{(x-1)(x^2+1)}\, dx$ converges to

(A)	(B)	(C)	(D)
$\frac{\pi}{2}+\ln 5+\tan^{-1}2$	$-\frac{\pi}{2}+\ln 5+\tan^{-1}2$	$-\frac{\pi}{2}-\ln 5+\tan^{-1}2$	$-\frac{\pi}{2}+\ln 5-\tan^{-1}2$

السؤال رقم 40 هو تكرار للسؤال رقم 38 و يجب أن تجيب عليه للحصول على درجته

Q40.

The improper integral converges to

(A)	(B)	(C)	(D)
$\frac{\pi}{2}+\ln 5+\tan^{-1}2$	$-\frac{\pi}{2}+\ln 5+\tan^{-1}2$	$-\frac{\pi}{2}-\ln 5+\tan^{-1}2$	$-\frac{\pi}{2}+\ln 5-\tan^{-1}2$

D