

جامعة الملك عبدالعزيز.

كلية العلوم.

الاسم: _____

قسم الرياضيات.

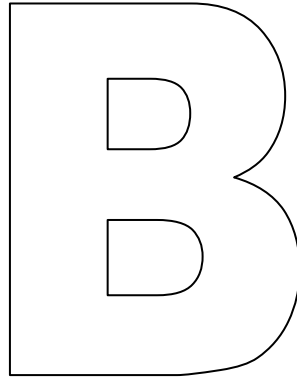
الرقم الجامعي: _____

math 202.
Calculus 2.

Second Exam

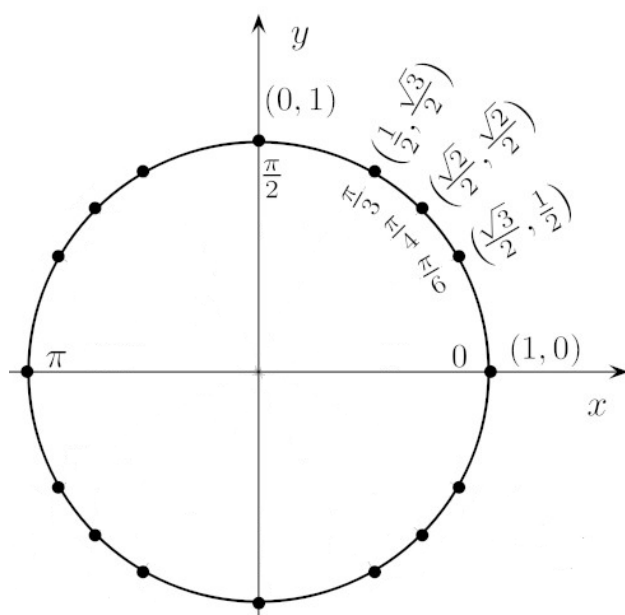
Date: Sunday 25 / 1 / 1434 H.

Time: from 18:00 to 19:30.



- تأكد من أن رمز نموذج الإجابة لديك هو 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

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

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

Q3.

$$\int \tan^3 x \sec^5 x \, dx =$$

(A)

$$\frac{\sec^7 x}{7} - \frac{\sec^5 x}{5} + c$$

(B)

$$\frac{\tan^4 x}{4} + \frac{\sec^4 x}{4} + c$$

(C)

$$\frac{\sec^7 x}{7} - \frac{\sec^3 x}{3} + c$$

(D)

$$\frac{\tan^5 x}{5} + \frac{\tan^3 x}{3} + c$$

Q4.

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

(A)

$$\frac{\sqrt{9-x^2}}{x} - \sin^{-1}\left(\frac{x}{3}\right) + c$$

(B)

$$-\frac{\sqrt{9-x^2}}{x} - \sin^{-1}\left(\frac{x}{3}\right) + c$$

(C)

$$\frac{\sqrt{9-x^2}}{x} + \sin^{-1}\left(\frac{x}{3}\right) + c$$

(D)

$$\frac{\sqrt{9+x^2}}{x} - \sin^{-1}\left(\frac{x}{3}\right) + c$$

Q5.

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

(A) $\sin^{-1}(x) + c$

(B) $\cos^{-1}(x) + c$

(C) $\ln|x - \sqrt{x^2 - 1}| + c$

(D) $\ln|x + \sqrt{x^2 - 1}| + c$

Q6.

$$\int \frac{x}{\sqrt{x^2+100}} dx =$$

(A) $-\sqrt{x^2 + 100} + c$

(B) $\frac{\sqrt{x^2+100}}{10} + c$

(C) $\sqrt{x^2 + 100} + c$

(D) $-\frac{\sqrt{100+x^2}}{x} - \tan^{-1}\left(\frac{x}{10}\right) + c$

Q7. $\int \frac{1}{(x-3)(x-2)} dx$	
(A) $\ln\left \frac{x+3}{x+2}\right + c$	(B) $\ln\left \frac{x-2}{x-3}\right + c$
(C) $\ln x-3 + \ln x-2 + c$	(D) $\ln\left \frac{x-3}{x-2}\right + c$

Q8. $\int \frac{1}{x^2\sqrt{9-x^2}} dx =$			
(A) $-\frac{\sqrt{4-x^2}}{9x} + c$	(B) $\frac{\sqrt{9-x^2}}{9x} + c$	(C) $-\frac{\sqrt{9-x^2}}{9x} + c$	(D) $-\frac{\sqrt{9-x^2}}{x} + c$

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

Q10. $\int \frac{1}{x^2(x+2)} dx =$	
(A) $\frac{1}{4} \ln \left \frac{x+2}{x} \right + \frac{1}{2x} + c$	(B) $\ln \left \frac{x+2}{x} \right - \frac{1}{2x} + c$
(C) $\frac{-1}{4} \ln \left \frac{x+2}{x} \right - \frac{1}{2x} + c$	(D) $\frac{1}{4} \ln \left \frac{x+2}{x} \right - \frac{1}{2x} + c$

Q11. $\int \frac{1+\cos x}{\cos^2(x)} dx =$	
(A) $\tan x + \ln \sec x - \tan x + c$	(B) $\tan x + \ln \sec x + \tan x + c$
(C) $\tan x - \ln \sec x + \tan x + c$	(D) $-\tan x + \ln \sec x + \tan x + c$

Q12. $\int \frac{\sqrt{x}}{1+x^3} dx =$				
(A) $\frac{1}{3} \tan^{-1} \left(x^{\frac{3}{2}} \right) + c$	(B) $\frac{2}{3} \sin^{-1} \left(x^{\frac{3}{2}} \right) + c$	(C) $\ln(1 + x^3) + c$	(D) $\tan^{-1}(x^3) + c$	(E) $\frac{2}{3} \tan^{-1} \left(x^{\frac{3}{2}} \right) + c$

Q13. $\int \frac{e^{2x}}{e^x - 1} dx =$				
(A) $e^{-x} - \ln(e^x + 1) + c$	(B) $e^x + \ln(e^x + 1) + c$	(C) $e^x + \ln e^x - 1 + c$	(D) $e^x - \ln e^x - 1 + c$	

Q14. $\int_1^{\infty} \frac{10}{x^3} dx =$				
(A) 1	(B) 5	(C) 2	(D) Divergent	

Q15.

$$\int_1^e \frac{1}{x^4 \sqrt{\ln x}} dx$$

(A)
Divergent

(B)
 $\frac{2}{3}$

(C)
 $\frac{3}{4}$

(D)
 $\frac{4}{3}$

Q16.

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

(A)
 $\ln|x^3 + 5x| - \tan^{-1}\left(\frac{x}{\sqrt{5}}\right) + c$

(B)
 $\ln|x^3 + 5x| + \frac{1}{\sqrt{5}} \tan^{-1}\left(\frac{x}{\sqrt{5}}\right) + c$

(C)
 $\ln|x^3 - 5x| - \frac{1}{\sqrt{5}} \tan^{-1}\left(\frac{x}{\sqrt{5}}\right) + c$

(D)
 $\ln|x^3 + 5x| - \frac{1}{\sqrt{5}} \tan^{-1}\left(\frac{x}{\sqrt{5}}\right) + c$

Q17.

Use the formula

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

To evaluate

$$\int x^5 \tan^{-1}(x^3) dx =$$

(A)

$$\frac{x^6 - 1}{6} \tan^{-1}(x^3) - \frac{x^3}{6} + c$$

(B)

$$\frac{x^6 + 1}{3} \tan^{-1}(x^3) - \frac{x^3}{6} + c$$

(C)

$$\frac{x^6 + 1}{6} \tan^{-1}(x^3) - \frac{x^3}{6} + c$$

(D)

$$\frac{x^6 + 1}{6} \tan^{-1}(x^3) + \frac{x^3}{6} + c$$

Q18.

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

(A)

$$\frac{3}{2} \ln \left| x^{\frac{2}{3}} + 1 \right| + c$$

(B)

$$\frac{3}{2} \ln \left| x^{\frac{2}{3}} - 1 \right| + c$$

(C)

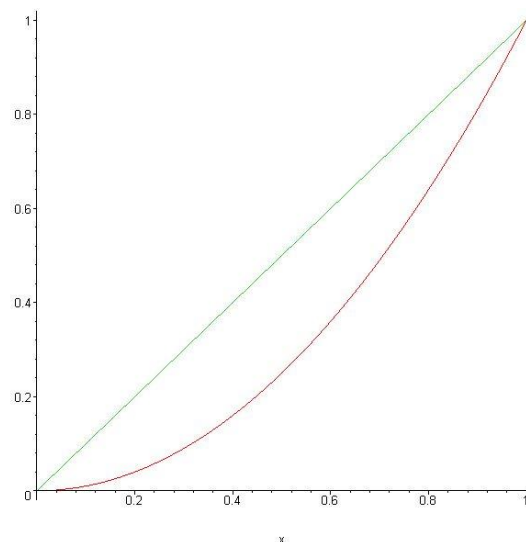
$$\frac{1}{3} \ln \left| \sqrt[3]{x} - 1 \right| + c$$

(D)

$$\frac{1}{3} \ln \left| \sqrt[3]{x} + 1 \right| + c$$

Q19.

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



(A)

$$\frac{1}{6}$$

(B)

$$\frac{1}{12}$$

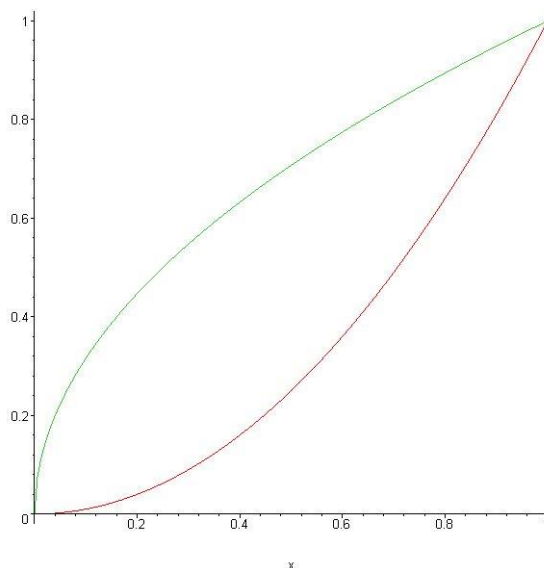
(C)

$$\frac{\pi}{6}$$

(D)

$$\frac{1}{3}$$

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)

$$\frac{1}{2}\pi$$

(B)

$$\frac{1}{6}\pi$$

(C)

$$\frac{1}{3}\pi$$

(D)

$$\frac{3}{10}\pi$$

