جامعة الملك عبدالعزيز.

كلية العلوم. الاسم:________________________

قسم الرياضيات. الرقم الجامعي:___________________

math 202.
Calculus 2.

Second Exam

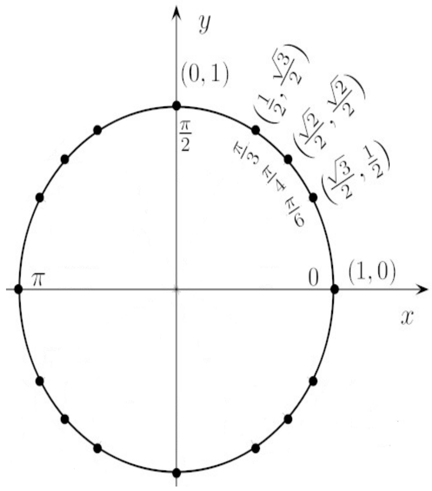
Date: Sunday 1 / 6 / 1433 H.
Time: from 20:45 to 22:15.

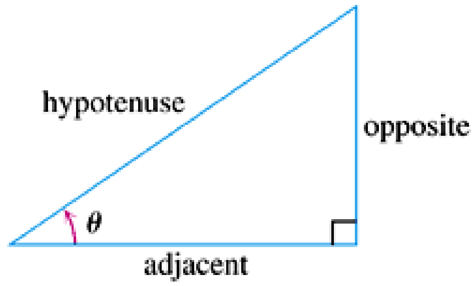
A

- 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.

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

The Unit Circle





$$\sin\theta = \frac{\text{opp}}{\text{hyp}} \qquad \csc\theta = \frac{\text{hyp}}{\text{opp}}$$

$$\cos\theta = \frac{\text{adj}}{\text{hyp}} \qquad \sec\theta = \frac{\text{hyp}}{\text{adj}}$$

$$\tan\theta = \frac{\text{opp}}{\text{adj}} \qquad \cot\theta = \frac{\text{adj}}{\text{opp}}$$

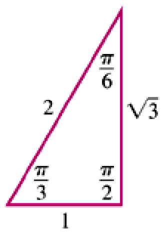
$$\sin 2\theta = 2\sin\theta\cos\theta$$

$$\sin^2\theta = \frac{1}{2}(1 - \cos 2\theta)$$

$$\sin A\ \cos B = \frac{1}{2}[\sin(A - B) + \sin(A + B)]$$

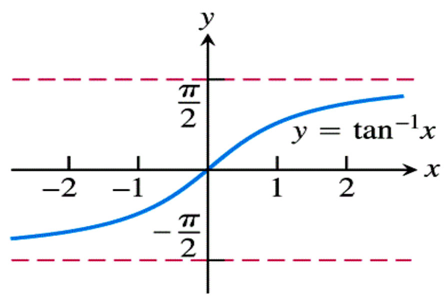
$$\sin A\ \sin B = \frac{1}{2}[\cos(A - B) - \cos(A + B)]$$

$$\cos A\ \cos B = \frac{1}{2}[\cos(A - B) + \cos(A + B)]$$



$$\sinh x = \frac{1}{2}(e^x - e^{-x})$$

$$\cosh x = \frac{1}{2}(e^x + e^{-x})$$



$$\int \frac{du}{\sqrt{2au - u^2}} = \cos^{-1}\left(\frac{a - u}{a}\right) + C$$

$$\int \frac{u\,du}{\sqrt{2au - u^2}} = -\sqrt{2au - u^2} + a\cos^{-1}\left(\frac{a - u}{a}\right) + C$$

$$\int \frac{u^2 du}{\sqrt{2au - u^2}} = -\frac{(u + 3a)}{2}\sqrt{2au - u^2} + \frac{3a^2}{2}\cos^{-1}\left(\frac{a - u}{a}\right) + C$$

$$\int \frac{du}{u\sqrt{2au - u^2}} = -\frac{\sqrt{2au - u^2}}{au} + C$$

A

Q1. example 4, page 455 $$\int e^x \sin x \; dx =$$	
(A) $e^x \cos x + C$	(B) $\dfrac{e^x(\sin x + \cos x)}{2} + C$
(C) $\dfrac{e^{x+1}}{x+1} \cos x + C$	(D) $\dfrac{e^x(\sin x - \cos x)}{2} + C$

Q2. Problem 21, page 457 $$\int_0^1 x \cosh x \; dx =$$				
(A) $\dfrac{1-e}{e}$	(B) $\dfrac{e+1}{e}$	(C) $\dfrac{e-2}{e}$	(D) $\dfrac{2e-1}{e}$	(E) $\dfrac{e-1}{e}$

Q3. Similar to example 9, page 465 $$\int \cos 3x \sin 4x \; dx =$$		
(A) $\frac{1}{2}\left[\cos x + \dfrac{\cos 7x}{7}\right] + C$	(B) $-\frac{1}{2}\left[\cos x + \dfrac{\cos 7x}{7}\right] + C$	(C) $\frac{1}{2}\left[\sin x + \dfrac{\sin 7x}{7}\right] + C$
(D) $-\frac{1}{2}\left[\sin x + \dfrac{\sin 7x}{7}\right] + C$	(E) $\frac{1}{2}\left[\cos x - \dfrac{\cos 7x}{7}\right] + C$	

Q4. Problem 1, page 465 $$\int \sin^3 x \cos^2 x \, dx =$$		
(A) $\dfrac{\cos^5 x}{5} - \dfrac{\cos^3 x}{3} + C$	(B) $\dfrac{\sin^5 x}{5} - \dfrac{\sin^3 x}{3} + C$	(C) $-\dfrac{\cos^5 x}{5} - \dfrac{\cos^3 x}{3} + C$
(D) $-\dfrac{\sin^5 x}{5} - \dfrac{\sin^3 x}{3} + C$	(E) $\dfrac{\sin^5 x}{5} + \dfrac{\sin^3 x}{3} + C$	

Q5. To evaluate $\int \frac{x^2}{\sqrt{9-x^2}}\, dx$ using Trigonometric substitution, we let	
(A) $x = 3\tan\theta, \; -\frac{\pi}{2} < \theta < \frac{\pi}{2}$	(B) $x = 3\sin\theta, \; -\frac{\pi}{2} < \theta < \frac{\pi}{2}$
(C) $x = 3\sec\theta, \; 0 \le \theta < \frac{\pi}{2}$ or $\pi \le \theta < \frac{3\pi}{2}$	(D) $x = 3\cosh\theta$

A

Q6. $$\int \frac{x^2}{\sqrt{9-\ x^2}}\,dx =$$	
(A) $$\frac{3x^3}{\sqrt{9-\ x^2}} + C$$	(B) $$\frac{9}{2}\sin^{-1}\left(\frac{x}{3}\right) - \frac{x}{2}\sqrt{9-x^2}\ + C$$
(C) $$\tan^{-1}\left(\frac{x}{3}\right) - \frac{x}{2}\sqrt{9-x^2}\ + C$$	(D) $$\frac{2}{9}\sin^2\left(\frac{x}{3}\right) - \frac{x}{2}\sqrt{9-x^2}\ + C$$

Q7. Problem 17, page 482. The form of the partial fraction decomposition of $\frac{4y^2-7y-12}{y(y+2)(y-3)}$ is $\frac{A}{y} + \frac{B}{y+2} + \frac{C}{y-3}$. Solving for $A, B,$ and C, we get			
(A) $A = 2,\ B = -\frac{8}{5},\ C = \frac{1}{5}$	(B) $A = 2,\ B = \frac{9}{5},\ C = -\frac{1}{5}$	(C) $A = 2,\ B = \frac{9}{5},\ C = \frac{1}{5}$	(D) $A = -2,\ B = \frac{8}{5},\ C = \frac{1}{5}$

Q8. Problem 17, page 482. $$\int \frac{4y^2 - 7y - 12}{y(y+2)(y-3)}\,dy =$$	
(A) $$2\ln\lvert y\rvert - \frac{8}{5}\ln\lvert y+2\rvert + \frac{1}{5}\ln\lvert y-3\rvert + C$$	(B) $$2\ln\lvert y\rvert + \frac{9}{5}\ln\lvert y+2\rvert - \frac{1}{5}\ln\lvert y-3\rvert + C$$
(C) $$2\ln\lvert y\rvert + \frac{9}{5}\ln\lvert y+2\rvert + \frac{1}{5}\ln\lvert y-3\rvert + C$$	(D) $$-2\ln\lvert y\rvert + \frac{8}{5}\ln\lvert y+2\rvert + \frac{1}{5}\ln\lvert y-3\rvert + C$$

Q9. $$\int \frac{x\,dx}{\sqrt{6x - x^2}} =$$ Hint: Use a suitable formula from the second page.	
(A) $$\cos^{-1}\left(\frac{3-x}{3}\right) + C$$	(B) $$-\frac{\sqrt{6x-x^2}}{3x} + C$$
(C) $$-\frac{(x+6)}{2}\sqrt{6x-x^2} + \frac{27}{2}\cos^{-1}\left(\frac{3-x}{3}\right) + C$$	(D) $$-\sqrt{6x-x^2} + 3\cos^{-1}\left(\frac{3-x}{3}\right) + C$$

Q10. problem 11, page 515 The improper integral $\int_0^\infty \frac{x\ dx}{1+x^2}$			
(A) converges to $\frac{\pi}{2}$	(B) converges to $-\frac{\pi}{2}$	(C) diverges	(D) converges to 0

Q11. Problem 25, page 515 $$\int_e^\infty \frac{1}{x\,(\ln x)^3}\,dx =$$				
(A) $\frac{\pi+\sqrt{2}}{2}$	(B) $\frac{\sqrt{3}}{2}$	(C) $-\frac{\pi}{2}$	(D) $\frac{\pi}{2}$	(E) $\frac{1}{2}$

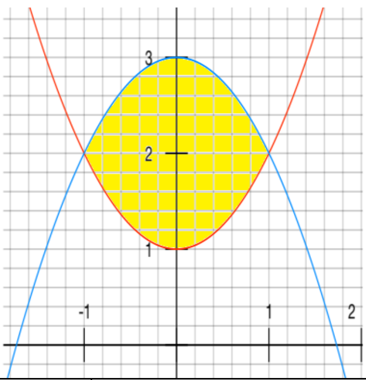
Q12. $$\int_0^3 \frac{x-5}{x^2-6x+5}\,dx =$$				
(A) divergent	(B) 0	(C) $\ln 2$	(D) $\ln 3$	(E) $\ln 4$

Q13. Similar to problem 17, page 466. $$\int \sin^2 x\ \cot^3 x\ dx =$$	
(A) $\ln\lvert\sin x\rvert + \sin^2 x + C$	(B) $\ln\lvert\sin x\rvert - \sin^2 x + C$
(C) $\ln\lvert\sin x\rvert + \frac{1}{2}\sin^2 x + C$	(D) $\ln\lvert\sin x\rvert - \frac{1}{2}\sin^2 x + C$

تم إلغاء هذا السؤال للتعديل الذي حدث في منهج الدوري الثاني.

Q13. problem 18, page 420

The area enclosed between the graphs $y = x^2 + 1$ and $y = 3 - x^2$ is



(A)	(B)	(C)	(D)
2	3	4	8 correct

A

Answers to the second exam

1 / 6 / 1433H

A

1	D
2	E
3	B
4	A
5	B
6	B
7	C
8	C
9	D
10	C
11	E
12	A
13	D