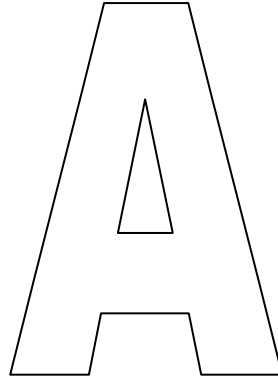


math 202.
Calculus 2.

First Exam

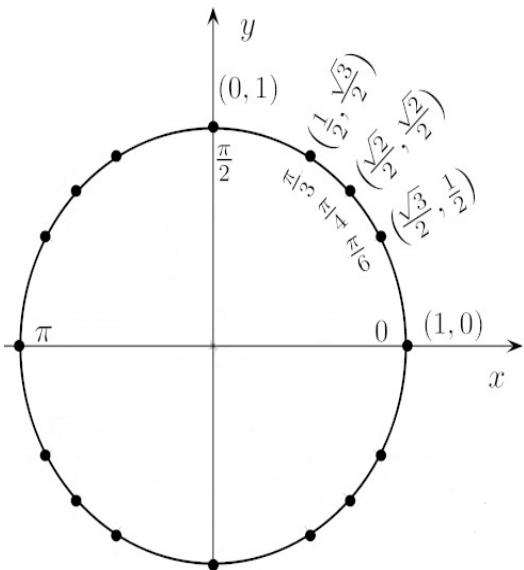
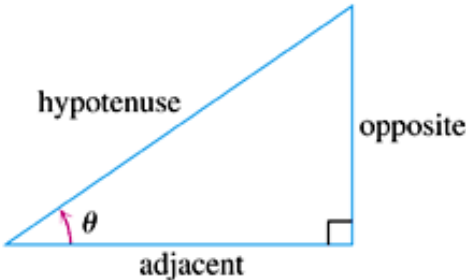
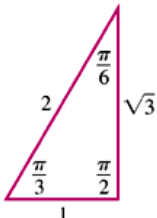
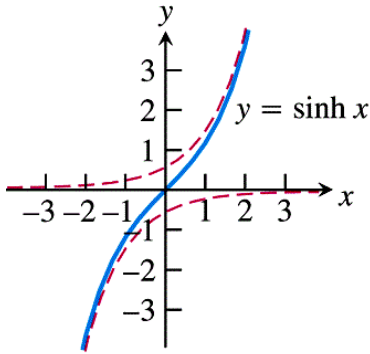
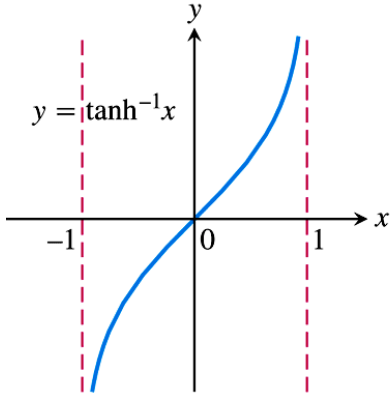
Date: Sunday 11 / 4 / 1433 H.

Time: from 20:45 to 22:15.



- 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  The diagram shows a unit circle centered at the origin of a Cartesian coordinate system. The x-axis is labeled with π at the leftmost point and 0 at the rightmost point. The y-axis is labeled with $\frac{\pi}{2}$ at the topmost point. Several points on the circle are marked with their coordinates: $(0, 1)$, $(\frac{1}{2}, \frac{\sqrt{3}}{2})$, $(\frac{\sqrt{3}}{2}, \frac{1}{2})$, $(1, 0)$, $(\frac{1}{2}, -\frac{\sqrt{3}}{2})$, $(-\frac{1}{2}, -\frac{\sqrt{3}}{2})$, $(-1, 0)$, $(-\frac{\sqrt{3}}{2}, \frac{1}{2})$, and $(-\frac{1}{2}, \frac{\sqrt{3}}{2})$. The angles between these points are labeled as $\frac{\pi}{6}$, $\frac{\pi}{4}$, and $\frac{\pi}{3}$.	 A right-angled triangle is shown with a horizontal base labeled 'adjacent', a vertical side labeled 'opposite', and a hypotenuse labeled 'hypotenuse'. The angle at the bottom-left vertex is labeled θ. $\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \csc \theta = \frac{\text{hyp}}{\text{opp}}$ $\cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \sec \theta = \frac{\text{hyp}}{\text{adj}}$ $\tan \theta = \frac{\text{opp}}{\text{adj}} \quad \cot \theta = \frac{\text{adj}}{\text{opp}}$
$\cosh^2 x - \sinh^2 x = 1$	 A right-angled triangle with angles $\frac{\pi}{6}$, $\frac{\pi}{3}$, and $\frac{\pi}{2}$. The sides are labeled: the hypotenuse is 2, the side opposite $\frac{\pi}{6}$ is 1, and the side opposite $\frac{\pi}{3}$ is $\sqrt{3}$.
$\ln e^x = x \text{ for all } x.$ $e^{\ln x} = x \text{ for } x > 0.$	
$\ln x^r = r \ln x \text{ for } x > 0 \text{ and any real number } r$	$\sin 2\theta = 2 \sin \theta \cos \theta$
$\int \frac{dx}{x^2 + a^2} = \frac{1}{a} \tan^{-1} \left(\frac{x}{a} \right) + C$	$\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1} \left(\frac{x}{a} \right) + C$
$\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}$	$\sum_{i=1}^n i = \frac{n(n+1)}{2}$
 A graph of the function $y = \sinh x$ is shown. The x-axis ranges from -3 to 3, and the y-axis ranges from -3 to 3. The curve passes through the origin (0,0) and is symmetric about the origin. Dashed lines represent the asymptotes $y = e^x$ and $y = -e^{-x}$.	 A graph of the function $y = \tanh^{-1} x$ is shown. The x-axis ranges from -1 to 1, and the y-axis ranges from -1 to 1. The curve passes through the origin (0,0) and is symmetric about the origin. Dashed vertical lines at $x = -1$ and $x = 1$ represent the asymptotes.

Q1. Definition and figure 1 page 255 $\lim_{x \rightarrow \infty} \sinh x =$				
(A) 0	(B) $-\infty$	(C) -1	(D) ∞	(E) 1

Q2. Similar to problem 3, page 259 $\sinh(\ln 4) =$				
(A) $\frac{13}{8}$	(B) $\frac{15}{8}$	(C) $\frac{17}{8}$	(D) $\frac{19}{8}$	(E) $\frac{21}{8}$

Q3. Similar to example 5, page 259 $\frac{d}{dx}(\tanh^{-1}(\cos x)) =$				
(A) $-\cos x$	(B) $-\sin x$	(C) $-\csc x$	(D) $\sec x$	(E) $\tan x$

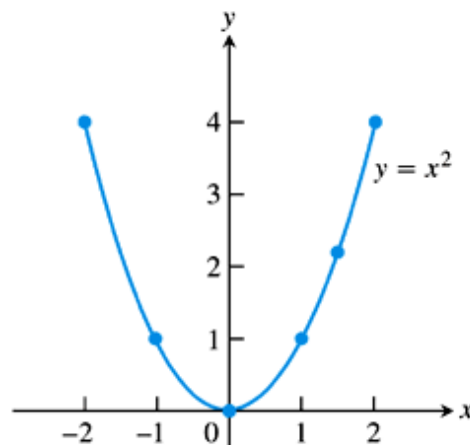
Q4. Table of identities, page 255 $\operatorname{sech}^2 x + \tanh^2 x =$				
(A) 1	(B) 0	(C) -1	(D) π	(E) π^2

Q5. Similar to problem 30, page 348 If $f'(x) = 8x^3 + 12x + 3$ and $f(1) = 6$, then $f(x) =$	
(A) $2x^4 + 6x^2 + 3x + 5$	(B) $2x^4 + 6x^2 + 3x - 5$
(C) $8x^4 + 12x^2 + 3x + 10$	(D) $8x^4 + 12x^2 + 3x - 10$

Q6. Similar to problem 8, page A38 $\sum_{i=2}^{10} i^2 =$				
(A) -285	(B) 284	(C) 285	(D) 385	(E) 384

Q7. Similar to problem 3, page 364

The estimation of the area under the graph of $f(x) = x^2$ from $x = 0$ to $x = 2$ using two approximating rectangles and right endpoints is



- | | | | | |
|----------|----------|----------|----------|----------|
| (A)
5 | (B)
4 | (C)
3 | (D)
2 | (E)
1 |
|----------|----------|----------|----------|----------|

Q8. Similar to problem 17, page 377

The integral expression of $\lim_{n \rightarrow \infty} \sum_{i=1}^n (16x_i^7 + \cos x_i) \Delta x$ over the interval $[0, \pi]$ is

- | | | | |
|--|--|---|---|
| (A)
$\int_0^\pi (2x^8 - \sin x) dx$ | (B)
$\int_0^\pi (2x^8 + \sin x) dx$ | (C)
$\int_0^\pi (16x^7 + \cos x) dx$ | (D)
$\int_0^\pi (16x^7 - \cos x) dx$ |
|--|--|---|---|

Q9. Property 8, page 375

If $2 \leq f(x) \leq 5$ for all $x \in [-1, 1]$, then

- | | | | |
|---|--|--|---|
| (A)
$-1 \leq \int_{-1}^1 f(x) dx \leq 3$ | (B)
$1 \leq \int_{-1}^1 f(x) dx \leq 3$ | (C)
$11 \leq \int_{-1}^1 f(x) dx \leq 16$ | (D)
$4 \leq \int_{-1}^1 f(x) dx \leq 10$ |
|---|--|--|---|

Q10. Property 5, page 374

If $\int_2^8 g(x) dx = 17$ and $\int_2^4 g(x) dx = 7$, then $\int_4^8 g(x) dx =$

- | | | | | |
|------------|-----------|------------|-----------|-----------|
| (A)
-12 | (B)
12 | (C)
-10 | (D)
24 | (E)
10 |
|------------|-----------|------------|-----------|-----------|

Q11. Definition, page 340

A function F is an antiderivative of a function f on the interval (a, b) if for all $x \in (a, b)$ we have

- | | | | |
|------------------------|-----------------------|------------------------------|--------------------------|
| (A)
$F''(x) = f(x)$ | (B)
$F'(x) = f(x)$ | (C)
$\int F(x) dx = f(x)$ | (D)
$F(x) = f(x) + C$ |
|------------------------|-----------------------|------------------------------|--------------------------|

Q12. FTC similar to example 4 page 384

$$\frac{d}{dx} \left(\int_1^{x^4} \cosh t dt \right) =$$

- | | | | | |
|-------------------------|-------------------------|--------------------------|--------------------------|--------------------|
| (A)
$4x^3 \cosh x^4$ | (B)
$4x^3 \sinh x^4$ | (C)
$-4x^3 \cosh x^4$ | (D)
$-4x^3 \sinh x^4$ | (E)
$\cosh x^4$ |
|-------------------------|-------------------------|--------------------------|--------------------------|--------------------|

Q13. problem 29, page 388				
$\int_1^9 \frac{x-1}{\sqrt{x}} dx =$				
(A) 10	(B) $\frac{40}{3}$	(C) $\frac{34}{3}$	(D) $-\frac{40}{3}$	(E) $-\frac{34}{3}$

Q14. Property page 373				
$\int_2^{\frac{2}{e}} \frac{\cosh^{-1} x}{e^x + 1} dx =$				
(A) $2e^2$	(B) e^2	(C) $-\frac{1}{e^2}$	(D) 0	(E) $\frac{1}{e^2}$

Q15. Similar to problem 60, page 407				
$\int_{-2}^2 \frac{\sinh x}{x^4 + x^2} dx =$				
(A) $\frac{e^2}{32}$	(B) 0	(C) $\frac{e^2 - 2}{32}$	(D) $\frac{2 - e^2}{32}$	(E) $\frac{4 - e^2}{32}$

Q16. Problem 30, page 407				
$\int \frac{\sin(\ln x)}{x} dx =$				
(A) $-\sin(\ln x) + C$	(B) $\sin(\ln x) + C$	(C) $-\cos(\ln x) + C$	(D) $\cos(\ln x) + C$	(E) $\frac{-2\cos(\ln x)}{x^2} + C$

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

Q17.				
$\int \frac{\sin(\ln x)}{x} dx =$				
(A) $-\sin(\ln x) + C$	(B) $\sin(\ln x) + C$	(C) $-\cos(\ln x) + C$	(D) $\cos(\ln x) + C$	(E) $\frac{-2\cos(\ln x)}{x^2} + C$

Q18. Similar to problem 18, page 406				
$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \csc \theta \cot \theta d\theta =$				
(A) $\frac{1-2\sqrt{3}}{\sqrt{3}}$	(B) $\frac{2+2\sqrt{3}}{\sqrt{3}}$	(C) $\frac{2-2\sqrt{3}}{\sqrt{3}}$	(D) $\frac{2\sqrt{3}-2}{\sqrt{3}}$	(E) 0

السؤال رقم 19 هو تكرار للسؤال رقم 18 و يجب أن تجيب عليه للحصول على درجته

Q19.				
$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \csc \theta \cot \theta d\theta =$				
(A) $\frac{1-2\sqrt{3}}{\sqrt{3}}$	(B) $\frac{2+2\sqrt{3}}{\sqrt{3}}$	(C) $\frac{2-2\sqrt{3}}{\sqrt{3}}$	(D) $\frac{2\sqrt{3}-2}{\sqrt{3}}$	(E) 0

Q20. FTC and derivative table page 256 If $\int f(x)dx = F(x) + C$, then $\frac{d}{dx}(F(x) + \operatorname{csch} x) =$	
(A) $f(x) - \operatorname{csch} x \coth x$	(B) $f(x) + \operatorname{csch} x \coth x$
(C) $f'(x) - \operatorname{csch} x \coth x$	(D) $f'(x) + \operatorname{csch} x \coth x$

السؤال رقم 21 هو تكرار للسؤال رقم 20 و يجب أن تجيب عليه للحصول على درجته

Q21. If $\int f(x)dx = F(x) + C$, then $\frac{d}{dx}(F(x) + \operatorname{csch} x) =$	
(A) $f(x) - \operatorname{csch} x \coth x$	(B) $f(x) + \operatorname{csch} x \coth x$
(C) $f'(x) - \operatorname{csch} x \coth x$	(D) $f'(x) + \operatorname{csch} x \coth x$

Q22. $\int \frac{20x+4}{\sqrt[3]{5x^2+2x+1}} dx =$	
(A) $\sqrt{(5x^2 + 2x + 1)^2} + C$	(B) $\sqrt[3]{(5x^2 + 2x + 1)^2} + C$
(C) $3 \sqrt{(5x^2 + 2x + 1)^2} + C$	(D) $3\sqrt[3]{(5x^2 + 2x + 1)^2} + C$

السؤال رقم 23 هو تكرار للسؤال رقم 22 و يجب أن تجيب عليه للحصول على درجته

Q23. $\int \frac{20x+4}{\sqrt[3]{5x^2+2x+1}} dx =$	
(A) $\sqrt{(5x^2 + 2x + 1)^2} + C$	(B) $\sqrt[3]{(5x^2 + 2x + 1)^2} + C$
(C) $3 \sqrt{(5x^2 + 2x + 1)^2} + C$	(D) $3\sqrt[3]{(5x^2 + 2x + 1)^2} + C$

Q24. $\int_0^5 8 - 2x dx =$				
(A) -15	(B) 31	(C) 15	(D) 47	(E) 17

السؤال رقم 25 هو تكرار للسؤال رقم 24 و يجب أن تجيب عليه للحصول على درجته

Q25. $\int_0^5 8 - 2x dx =$				
(A) -15	(B) 31	(C) 15	(D) 47	(E) 17