OL Academy

MATHS102
Calculus II

مريم الجزيري

التسجيل لمراجعة Test1

يشمل فيديوات الشرح التفصيلي والنوتات لجميع الدروس
بالإضافة إلى حل أسئلة امتحانات سابقة

وقت المراجعة

يوم غد الأربعاء
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من 08:00 PM
إلى 11:00 PM

الساعات	السعر
3 ساعات	~~15~~ 10 BHD

سجّل الآن
عبر موقعنا

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Multiple Choice Questions.

1. The value of $\lim_{x\to 0^+} \sqrt{x}\,(\ln x)^2$ is
   A. ∞
   B. $-\infty$
   C. 0
   D. -1
   E. 1
   F. None of these

2. The value of $\lim_{x\to 0} \frac{x-\sin x}{x-\tan x}$ is
   A. 0
   B. ∞
   C. 1
   D. -2
   E. $-\frac{1}{2}$
   F. None of these

3. Up to some constant C the indefinite integral $\int \frac{\ln x}{x(\ln x-1)}\,dx$ is
   A. $\ln\left|\frac{x-1}{x}\right|$
   B. $\ln\left|\frac{x}{x-1}\right|$
   C. $\ln|\ln x-1|$
   D. $\ln|x(\ln x-1)|$
   E. $\ln|\ln x-x|$
   F. None of these

4. Suppose $f(1)=f'(2)=1, f(2)=f'(1)=2$. Assume that f'' is continuous on $[1,2]$. The definite integral $\int_1^2 xf''(x)\,dx$ is
   A. 0
   B. -1
   C. 1
   D. -2
   E. 2
   F. None of these

5. **Which of these is the volume of the solid formed by revolving the region bounded by the graphs $y = x$ and $y^2 = x$ about the y-axis?**
   - A. $\frac{2\pi}{15}$
   - B. $\frac{\pi}{6}$
   - C. $\frac{\pi}{2}$
   - D. $\frac{\pi}{15}$
   - E. $\frac{\pi}{3}$
   - F. None of these

6. $\lim_{x\to+\infty} e^{2x} - x\ln x =$
   - A. 0
   - B. $-\infty$
   - C. 1
   - D. e
   - E. $+\infty$
   - F. None of these

7. **The area of the region bounded by $y = -x^2$ and $y = x^2 - 1$ is**
   - A. $\frac{2\sqrt{2}}{3}$
   - B. $\frac{\sqrt{2}}{3}$
   - C. $\frac{2\sqrt{2}}{4}$
   - D. $\frac{\sqrt{3}}{4}$
   - E. $2\sqrt{3}$
   - F. None of these

8. $\int_{-1}^{0} xe^{-x^2}\,dx =$
   - A. $\frac{1+e}{2e}$
   - B. $\frac{e-1}{2e}$
   - C. $\frac{1}{2e}$
   - D. $\frac{1-e}{2e}$
   - E. $\frac{2e}{e+1}$
   - F. None of these

9. $\int x^2 \sin(3x)\, dx =$
   A. $-\frac{x^2}{3}\cos 3x + \frac{2}{9}x \sin 3x + \frac{2}{27}\cos 3x + C$
   B. $\frac{x^2}{3}\cos 3x + \frac{2}{9}x \sin 3x + \frac{2}{27}\cos 3x + C$
   C. $-\frac{x^2}{3}\cos 3x + \frac{2}{9}x \sin 3x - \frac{2}{27}\cos 3x + C$
   D. $\sin 3x\left(-\frac{x^2}{3} + \frac{2}{9}x + \frac{2}{27}\right) + C$
   E. $\cos 3x\left(-\frac{x^2}{3} + \frac{2}{9}x + \frac{2}{27}\right) + C$
   F. None of these

10. The value of $\lim\limits_{x\to\left(\frac{\pi}{2}\right)^-} \frac{\sec x}{\tan x}$ is
   A. $-\infty$
   B. $+\infty$
   C. 1
   D. 0
   E. -1
   F. None of these

11. The value of $\lim\limits_{x\to 1} \frac{\ln(x)}{\sin(\pi x)}$ is
   A. 0
   B. $-\infty$
   C. $-\frac{1}{\pi}$
   D. π
   E. $-\pi$
   F. None of the above.

12. Compute the following limit by using L'Hospital Rule: $\lim\limits_{t\to 1}\left[\frac{t}{t-1} - \frac{1}{\ln(t)}\right]$.
   A. 1
   B. $\frac{1}{2}$
   C. ∞
   D. $-\infty$
   E. 0
   F. -1

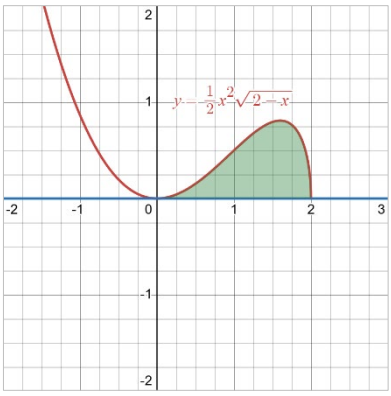
13. Find the indefinite integral $\int sin(\theta)\sqrt{1+cos(\theta)}\,d\theta$.
    A. $-\frac{2}{3}(1+cos(\theta))^{3/2}+C$
    B. $\frac{3}{2}(1+sin(\theta))^{2/3}+C$
    C. $-2(1+cos(\theta))^{1/2}+C$
    D. $3(1+sin(\theta))^{1/3}+C$
    E. $-\frac{2}{3}(1+sin(\theta))^{3/2}+C$
    F. None of the above.

14. Find the definite integral $\int_0^1 x\sqrt{1-x^2}\,dx$.
    A. $\frac{3}{2}$
    B. $\sqrt{2}$
    C. 1
    D. $\frac{\sqrt{2}}{2}$
    E. $\frac{1}{4}$
    F. $\frac{1}{3}$

15. Compute the indefinite integral $\int \frac{e^{sin^{-1}(x)}}{\sqrt{1-x^2}}\,dx$.
    A. $sin^{-1}(x)+C$
    B. $e^{sin^{-1}(x)}+C$
    C. $tan^{-1}(x)+C$
    D. $e^{tan^{-1}(x)}+C$
    E. $cos^{-1}(x)+C$
    F. $e^{cos^{-1}(x)}+C$

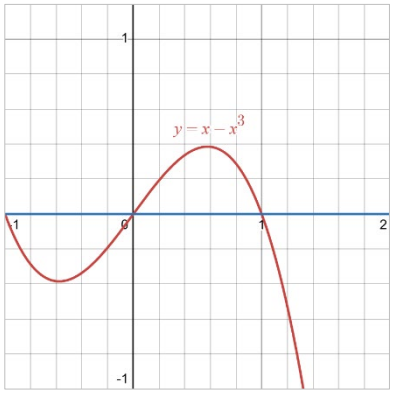
16. Use the appropriate method to find the volume of the solid formed by revolving the region bounded by the graphs of $y=\sqrt{x}$ and $y=x^2$ about the y-axis.
    A. 2π
    B. π
    C. $\frac{\pi}{2}$
    D. $\frac{\pi}{4}$
    E. $\frac{3\pi}{10}$
    F. $\frac{\pi}{5}$

17. A tank on the wing of a jet aircraft is formed by revolving the region bounded by the graph of $y = \frac{1}{2}x^2\sqrt{2-x}$ and the x-axis about the x-axis, where x and y are measured in meters. Find the tank's volume.



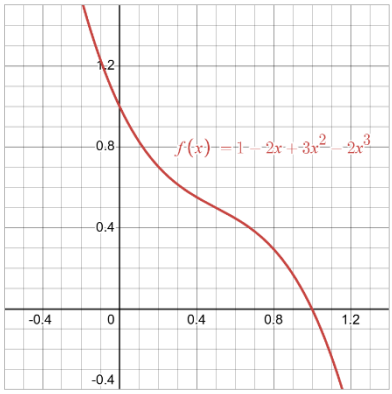
A. 6π
B. 5π
C. 3π
D. $\frac{8\pi}{15}$
E. $\frac{16\pi}{3}$
F. None of the above.

18. Use the shell method to find the volume of revolution formed by revolving the region bounded by $y = x - x^3$ and the x-axis about the y-axis. The most accurate answer is



A. $\frac{5\pi}{9}$
B. π
C. $\frac{5\pi}{3}$
D. $\frac{8\pi}{9}$
E. $\frac{4\pi}{15}$
F. $\frac{3\pi}{2}$

19. Use the appropriate method to find the volume of the solid obtained by rotating the area under the graph of $f(x) = 1 - 2x + 3x^2 - 2x^3$ and the x-axis over $[0, 1]$ about the y-axis. The most accurate answer is



A. $\frac{3\pi}{4}$
B. π
C. $\frac{4\pi}{3}$
D. 2π
E. $\frac{11\pi}{30}$
F. $\frac{3\pi}{2}$

20. Using the integration by parts method, evaluate the indefinite integral $\int x\cos(7x)\,dx$
    A. $\frac{1}{7}x\cos(7x)+\frac{1}{49}\sin(7x)+C$
    B. $\frac{1}{7}x\sin(7x)+\frac{1}{49}\cos(7x)+C$
    C. $x\sin(7x)+\cos(7x)+C$
    D. $x\cos(7x)+\sin(7x)+C$
    E. $\frac{1}{49}x\sin(7x)+\frac{1}{7}\cos(7x)+C$
    F. None of the above.

21. Consider the two functions y_1 and y_2 defined by $y_1=x^2$ and $y_2=-x^2+1$. Determine the area enclosed by the graphs of y_1 and y_2.
    A. $\frac{2\sqrt{2}}{3}$
    B. $\frac{\sqrt{2}}{3}$
    C. $\frac{2\sqrt{3}}{4}$
    D. $\frac{\sqrt{3}}{4}$
    E. $2\sqrt{3}$
    F. None of the above

22. Suppose that $f(1)=2, f(4)=7, f'(1)=5$ and $f'(4)=3$. We assume that f'' is a continuous function. Find the definite integral $\int_1^4 xf''(x)\,dx$.
    A. 4
    B. 3
    C. 2
    D. 1
    E. 0.5
    F. 0

23. The value of $\lim_{x\to 0^+}\sqrt{x}\ \ln x$ is
    A. ∞
    B. $-\infty$
    C. 0
    D. -1
    E. 1
    F. None of these

24. The value of $\lim_{x\to 0} \frac{x^3}{\tan x - x}$ is

A. 0
B. ∞
C. 1
D. 3
E. $\frac{1}{3}$
F. None of these

25. Up to some constant C the indefinite integral $\int \frac{dx}{x(\ln x - 1)}$ is

A. $\ln\left|\frac{x-1}{x}\right|$
B. $\ln\left|\frac{x}{x-1}\right|$
C. $\ln|\ln x - 1|$
D. $\ln|\ln x - x|$
E. $\ln|\ln x| - x$
F. None of these

26. $\int \sqrt{e^{3x} - e^{2x}}\, dx =$

A. $\frac{2}{3}(e^x - 1)^{\frac{3}{2}} + C$
B. $\frac{2}{3}\left(e^{3x} - e^{2x}\right)^{\frac{3}{2}} + C$
C. $\sqrt{\frac{3e^x}{2} - 1} + C$
D. $\frac{2}{3}e^x(e^x - 1)^{\frac{3}{2}} + C$
E. $\frac{1}{3}e^{3x} - \frac{1}{2}e^{2x} + C$
F. None of these

27. Using integration by parts once, the integral $\int (\ln x)^{2023}\, dx$ becomes

A. $2023\frac{(\ln x)^{2022}}{x} + C$
B. $x(\ln x)^{2023} - \int (\ln x)^{2022}\, dx$
C. $2023\int (\ln x)^{2022}\, dx$
D. $x(\ln x)^{2023} - 2023\int (\ln x)^{2022}\, dx$
E. $\frac{1}{2024}(\ln x)^{2024} + C$
F. None of these

28. Which of these is the volume of the solid formed by revolving the region bounded by the graphs $y = x$ and $y = \sqrt{x}$ about the y-axis?
    A. $\frac{2\pi}{15}$
    B. $\frac{\pi}{6}$
    C. $\frac{\pi}{2}$
    D. $\frac{\pi}{15}$
    E. None of these

29. $\lim_{x\to\infty} \frac{e^x}{\ln x} =$
    A. 0
    B. ∞
    C. 1
    D. e
    E. $-\infty$
    F. None of these

30. The area of the region bounded by $x^2 - 4y + 4 = 0$ and $x - 2y + 6 = 0$ is
    A. 12
    B. 9
    C. 7
    D. 5
    E. 3
    F. None of these

31. $\int_0^1 \frac{x}{e^{x^2}} dx$
    A. $\frac{1-e}{2e}$
    B. $\frac{e-1}{2e}$
    C. $\frac{1}{2e}$
    D. $\frac{1+e}{2e}$
    E. $\frac{2e}{e+1}$
    F. None of these

32. $\int x^2 e^{-3x}\,dx =$

A. $-\frac{1}{27}e^{-3x}(9x^2+6x+2)+C$

B. $e^{-3x}\left(-\frac{x^2}{3}+\frac{2x}{9}\right)+C$

C. $-\frac{1}{27}e^{-3x}(9x^2-6x+2)+C$

D. $-\frac{1}{27}e^{-3x}(9x^2-6x-2)+C$

E. $e^{-3x}(9x^2+6x+2)+C$

F. None of these

33. $\int x^4(1-2x^5)^6\,dx =$

A. $\frac{(1-2x^5)^7}{-7}+C$

B. $\frac{(1-2x^5)^7}{7}+C$

C. $\frac{(1-2x^5)^7}{-70}+C$

D. $\frac{(1-2x^5)^7}{70}+C$

34. $\int\left(\frac{\sqrt{x}+1}{x}\right)dx =$

A. $-2\sqrt{x}+ln|x|+C$

B. $\frac{1}{\sqrt{x}}+ln|x|+C$

C. $-\frac{1}{\sqrt{x}}+ln|x|+C$

D. $2\sqrt{x}+ln|x|+C$

35. $\int\frac{x-2}{x^2-4x+7}dx =$

A. $2\,ln|x^2-4x+7|+C$

B. $\frac{1}{2}ln|x^2-4x+7|+C$

C. $ln|x^2-4x+7|+C$

D. None of these

36. $\int \frac{cos\left(\frac{1}{x}\right)}{x^2} dx =$

A. $-sin\left(\frac{1}{x}\right) + C$

B. $sin\left(\frac{1}{x}\right) + C$

C. $cos\left(\frac{1}{x}\right) + C$

D. $-cos\left(\frac{1}{x}\right) + C$

37. $\int tan^2 x \, cos^3 x \, dx =$

A. $\frac{(sin x)^3}{3} + C$

B. $-\frac{(sin x)^3}{3} + C$

C. $-\frac{(cos x)^3}{3} + C$

D. $\frac{(cos x)^3}{3} + C$

38. $\int x^2 \, ln x \, dx$

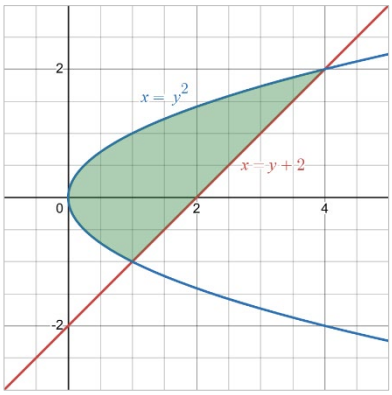
A. $\frac{x^3 \, ln x}{3} - \frac{x^3}{3} + C$

B. $\frac{x^3 \, ln x}{3} - \frac{x^3}{9} + C$

C. $\frac{x^4 \, ln x}{4} - \frac{x^3}{4} + C$

D. $\frac{x^4 \, ln x}{4} - \frac{x^3}{16} + C$

39. Set up an integral to evaluate the area of the region bounded by $x = y^2$ and $x = y + 2$.



A. $\int_{-2}^{1} y + 2 - y^2 \, dy$

B. $\int_{-1}^{2} -y^2 - y - 2 \, dy$

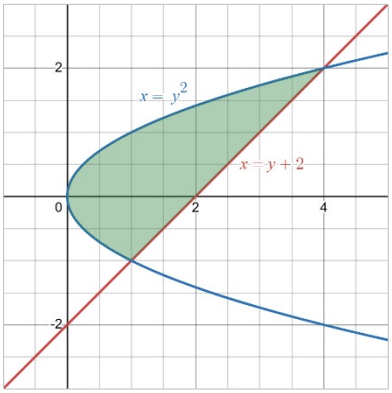
C. $\int_{1}^{4} \sqrt{x} - x + 2 \, dx$

D. $\int_{-1}^{2} y + 2 - y^2 \, dy$

E. $\int_{0}^{4} \sqrt{x} - x + 2 \, dx$

F. $\int_{-2}^{1} y + 2 + y^2 \, dy$

40. Set up an integral that represents the volume of the solid generated by revolving the region bounded by $x = y^2$ and $x = y + 2$ about the line $y = 3$.



A. $\int_{-1}^{2}(3-y)(y+2-y^2)\,dy$

B. $\int_{-1}^{2}2\pi(3-y)(y+2-y^2)\,dy$

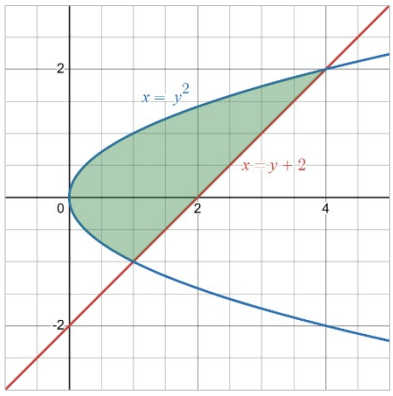
C. $\int_{-2}^{1}2\pi(3-y)(y^2-y-2)\,dy$

D. $\int_{1}^{4}(3-\sqrt{x})^2-(5-x)^2\,dx$

E. $\int_{-1}^{2}2\pi(3+y)(y+2-y^2)\,dy$

F. $\pi\int_{1}^{4}(3-\sqrt{x})^2-(5-x)^2\,dx$

41. Set up an integral that represents the volume of the solid generated by revolving the region bounded by $x = y^2$ and $x = y + 2$ about the line $x = 5$.



A. $\int_{-1}^{2}(5-y^2)^2-(3-y)^2\,dy$

B. $\pi\int_{-2}^{1}(5-y^2)^2-(3-y)^2\,dy$

C. $2\pi\int_{1}^{4}(5-x)(\sqrt{x}-x-2)\,dx$

D. $\pi\int_{-2}^{1}(5-y^2)^2-(5-y)^2\,dy$

E. $\int_{1}^{4}(5-x)(\sqrt{x}-x-2)\,dx$

F. $\pi\int_{-1}^{2}(5-y^2)^2-(3-y)^2\,dy$

42. Evaluate the integral $\int 9x\,sin(3x)\,dx$.

A. $-3x\,cos(3x)+sin(3x)+C$

B. $-3\,cos(3x)-sin(3x)+C$

C. $-3x^2\,cos(3x)+C$

D. $3x\,cos(3x)+C$

E. $-3x\,cos(3x)+9\,sin(3x)+C$

F. $3x\,cos(3x)+sin(3x)+C$

43. Evaluate the integral $\int \sin^{-1}x\,dx$.

A. $x\sin^{-1}x+2\sqrt{1-x^2}+C$

B. $x\sin^{-1}x-\sqrt{1-x^2}+C$

C. $x\sin^{-1}x+\sqrt{1-x^2}+C$

D. $\sqrt{1-x^2}+C$

E. $x\sin^{-1}x-\frac{1}{2}\sqrt{1-x^2}+C$

44. Evaluate the integral $\int \frac{3^x}{1+9^x} dx$.

A. $ln|1+9^x|+C$
B. $tan^{-1} 3^x + C$
C. $ln|1+3^x|+C$
D. $\frac{1}{ln 3} tan^{-1} 3^x + C$
E. $\frac{1}{ln 3} ln|1+3^x|+C$
F. $3^x + ln|1+9^x|+C$

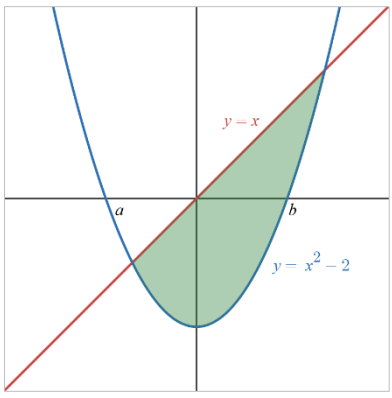
45. Evaluate the integral $\int \csc^4 x\, dx$.

A. $-\frac{1}{3}cot^3 x - cot x + C$
B. $\frac{1}{3}cot^3 x + cot x + C$
C. $-cot^3 x - cot x + C$
D. $\frac{1}{5}csc^5 x + C$
E. $\frac{1}{3}cot^3 x + C$
F. $-cot^3 x + x + C$

46. Evaluate the integral $\int \frac{1}{x\, ln(x^5)} dx$.

A. $ln|ln(x^5)|+C$
B. $\frac{1}{5}ln|x\, ln(x^5)|+C$
C. $\frac{2}{5}ln|ln(x^5)|+C$
D. $\frac{1}{5}ln|ln x|+C$
E. $5\, ln|ln(x^5)|+C$
F. $\frac{5}{4}ln|ln(x^5)|+C$

Consider the region $\mathcal{R}$ enclosed by the functions $y = x^2 - 2$ and $y = x$ (shaded on the right), where a and b are the x-coordinates of the intersection points between the two curves. Questions 47-50 are related to this region $\mathcal{R}$.



47. The values of a and b are

A. $a = -2, b = 1$
B. $a = 2, b = -1$
C. $a = -1, b = 2$
D. $a = 1, b = -2$
E. $a = 3, b = 0$
F. $a = 0, b = 3$

48. The area of the region $\mathcal{R}$ is

A. $\frac{1}{2}$
B. $\frac{1}{6}$
C. $-\frac{1}{6}$
D. $\frac{9}{2}$
E. $-\frac{3}{2}$
F. $\frac{3}{2}$

49. An integral that computes the volume of the solid of revolving the shaded region $\mathcal{R}$ about the line $y = 7$ is

A. $\pi \int_a^b (7-x)^2 - \left(7 - x^2 + 2\right)^2 \, dx$
B. $\pi \int_a^b \left(7 - x^2 + 2\right)^2 - (7-x)^2 \, dx$
C. $\pi \int_a^b (7-y)^2 - (9-y)^2 \, dy$
D. $2\pi \int_a^b (7-y)\left(y + y^2 - 2\right) dy$
E. $2\pi \int_a^b (7-x)\left(x - x^2 + 2\right) dx$
F. $\pi \int_a^b (7-x)^2 - \left(5 - x^2\right)^2 \, dx$

50. An integral that computes the volume of the solid of revolving the shaded region $\mathcal{R}$ about the line $x = 7$ is

A. $\pi \int_a^b (7-x)^2 - \left(7 - x^2 + 2\right)^2 \, dx$
B. $\pi \int_a^b \left(7 - x^2 + 2\right)^2 - (7-x)^2 \, dx$
C. $\pi \int_a^b (7-y)^2 - (9-y)^2 \, dy$
D. $2\pi \int_a^b (7-y)\left(y + y^2 - 2\right) dy$
E. $2\pi \int_a^b (7-x)\left(x - x^2 + 2\right) dx$
F. $\pi \int_a^b (7-x)^2 - \left(5 - x^2\right)^2 \, dx$

51. $\int 5x^9 e^{x^5} \, dx =$

A. $\frac{5x^7 e^{x^5}}{7}$
B. $e^{x^5} + C$
C. $x^5 e^{x^5} - e^{x^5} + C$
D. $x^6 e^{x^5} + C$
E. $x^{5x^6} e^{x^5} + C$
F. $xe^x - e^x + C$

52. Evaluate $\lim_{x\to\infty}\left(1+\frac{4}{x^2}\right)^{x^2}$.

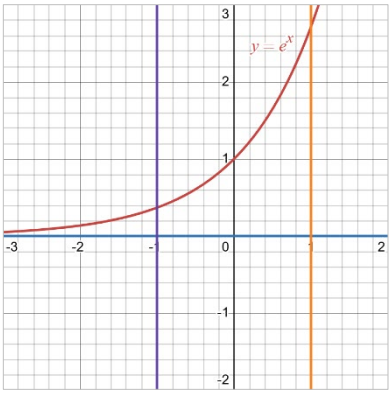
A. **1**
B. **3**
C. **4**
D. $-\infty$
E. **0**
F. **None of the above**

53. Evaluate $\int_{-1}^{1}\frac{xe^{x^2}+1}{1+x^2}dx$.

A. **1**
B. $-\pi$
C. π
D. $\frac{\pi}{2}$
E. **0**
F. **None of the above**

Written Questions.

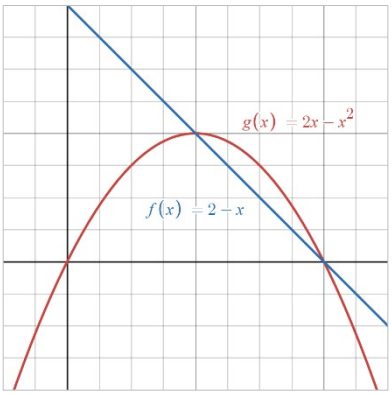
1. **Consider the region $\mathfrak{R}$ enclosed by the curves $y = e^x, y = 0, x = -1$ and $x = 1$.**
   a) **Find the area of the region $\mathfrak{R}$.**



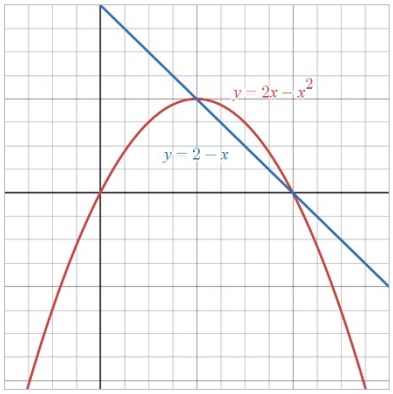
   b) **Set up but <u>do not evaluate</u> the integral that computes the volume of the solid by rotating the region $\mathfrak{R}$ about the line $y = -1$.**

   c) **Set up but <u>do not evaluate</u> the integral that computes the volume of the solid by rotating the region $\mathfrak{R}$ about the line $x = -2$.**

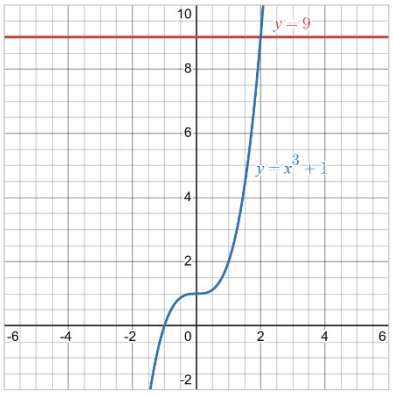
2. **Compute the area bounded by the graph of $f(x) = 2 - x$ and $g(x) = 2x - x^2$.**



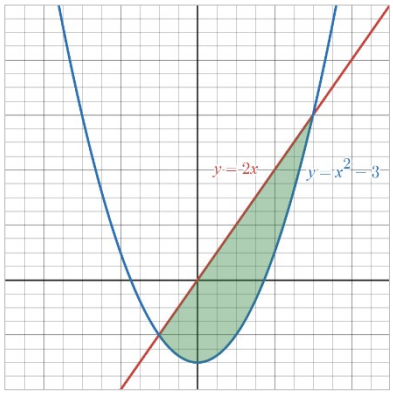
3. **Write down integral which will give you the volume of the solid generated when the region bounded by the graphs of $y = 2 - x$ and $y = 2x - x^2$ is revolved around the line $y = -2$.**



4. **By using the cylindrical shells method, write down integral which will give you the volume of the solid generated when the region bounded by the graphs of $y = x^3 + 1, y = 9$ and $x = 0$ is revolved around the y-axis.**



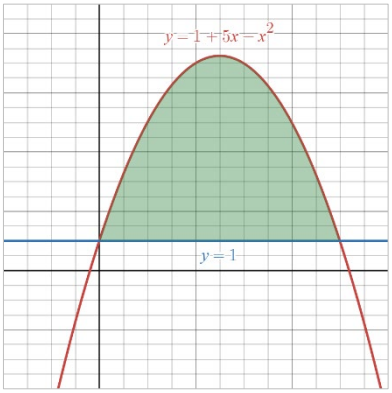
5. **Consider the region R enclosed by the curves $y = x^2 - 3$ and $y = 2x$.**
   a) **Find the area of the region R.**



   b) **Write down the integral that computes the volume of the solid generated by the rotation of the region R about the line $y = 7$.**

6. **Consider the region bounded by the functions $y = 1$ and $y = 1 + 5x - x^2$.**

   a) **Find the area of the shaded region.**



   b) **Set up but <u>do not evaluate</u> the integral that computes the volume of the solid by rotating the region about the line $y = 1$.**

   c) **Set up but <u>do not evaluate</u> the integral that computes the volume of the solid by rotating the region about the y-axis.**

   d) **Set up but <u>do not evaluate</u> the integral that computes the volume of the solid by rotating the region about the line $x = -1$.**

7. **Let R be the region bounded by $y = 4 - x^2$ and $y = 0$. Find the volume of the solid obtained by revolving R about the line $x = 3$.**

8. **Find the area bounded by the graph of $y = x^2, y = 2 - x$ and $y = 0$.**

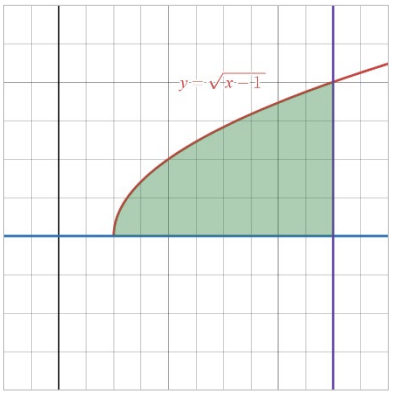
9. **Let R be the shaded region bounded by the graph of the functions $y = x$ and $y = x^2 - 2$.**
   a) **Set up an integral to find the area of the region R.**

   b) **Set up an integral that can be used to find the volume of the solid generated by revolving R about the line $x = -3$.**

   c) **Set up an integral that can be used to find the volume of the solid generated by revolving R about the line $y = 4$.**

10. Set up but do not evaluate the integral that represents the volume of the solid generated by revolving the region $y = \sqrt{x-1}, y = 0$ and $x = 5$ about the line $y = -2$.

a) Using the disk/washer method.



b) Using the cylindrical shell method.

11. Evaluate the integral $\int x\,tan^{-1}(x)\,dx$.

12. Evaluate the integral $\int x^3 e^{x^2}\,dx$.

13. Evaluate the integral $\int sin(ln\, x)\, dx$.

14. Evaluate the indefinite integral $\int ln(\sqrt{x})\, dx$.

15. Evaluate the integral $\int x^2\, sin\, x\, dx$.

16. Evaluate the integral $\int t\,cos^5(t^2)\,dt$.

17. Evaluate the integral $\int e^x\,cos\,x\,dx$.

18. Evaluate the integral $\int (x-2)(x+2)^{\frac{1}{3}}\,dx$.

19. Find $\int_0^{\frac{\pi}{2}} \cos x \sin(\sin x)\, dx$.

20. Find $\lim_{x \to 0^+} (\cosh x)^{\frac{1}{x}}$.

21. Find $\lim_{x \to \infty} e^x(1 - \cos(e^{-x}))$.

22. Let f be continuous on $[0, 9]$ and $\int_0^9 f(x)\,dx = 6$. Evaluate the definite integral $\int_{-3}^{3} |x| f(x^2)\,dx$.

23. If $\int_0^{\frac{\pi}{2}} cos(x^2)\,dx = 0.84914$, then find $\int_0^{\frac{\pi}{2}} 2x^2\, sin(x^2)\,dx$.