

1. Find the area of the region between the function $f(x)=x^2 + 2x$ and the x-axis from $x=0$ to $x=2$.
2. Find the area under the curve $y = 3x^2 + 2x + 1$ in the interval $[0, 2]$.

3. Consider the following data set.

24, 56, 12, 45, 21, 43, 21, 22

Find the median and Q1 (first quartile) for this data set.

4. Consider the following dataset representing the scores of students in a mathematics test: {75, 82, 90, 64, 77, 85, 79, 92}. Find the five-number summary, including the minimum value, first quartile (Q1), median (Q2), third quartile (Q3), and maximum value.
5. Consider a 3×3 matrix A with a determinant of 5. If the matrix A is given by,

$$\begin{pmatrix} 2 & 1 & 3 \\ 4 & x & 2 \\ 1 & 3 & 2 \end{pmatrix}$$

find the value of x.

6. If $A = \begin{pmatrix} 2 & x & 3 \\ 0 & 1 & 4 \\ 2 & 3 & 5 \end{pmatrix}$ and $\det(A) = 1$ find x.

7. Find the inverse of $A = \begin{pmatrix} 1 & 3 \\ 2 & 4 \end{pmatrix}$.

8. Consider a 2×2 matrix A and its inverse matrix A^{-1} , where A is given by:

$$\begin{pmatrix} 1 & 2 \\ 3 & x \end{pmatrix}.$$

and the inverse matrix is:

$$\begin{pmatrix} 4 & -1 \\ -3/2 & 1/2 \end{pmatrix}. \text{ Find } x.$$

9. $\log(x^2 + 10x + 25) = 2$. Find x.
10. $\log_2((3x + 1)/(2x + 1)) = 2$. Find x.
11. Find x. If $\log\left(\frac{x+1}{x}\right) = 1$
12. Find the equation of the line passes through the point (1,2) and parallel to the line $2x+4y=3$

13. Solve $x^2 + 3x + 4 = 8$.

14. A rectangular garden has an area of 80 square meters. The length of the garden is 2 meters more than twice its width. Find the dimensions of the garden.

15. A circle has a radius of 4 inches. Find the length of the arc intercepted by a central angle of 125°

16. Solve,

$$3x + 2y = 7$$

$$x - y = -1$$

17. $\int (x^2 + 3)^2 dx$

18. $\int (x^2 + 3x + 1)^2 dx$

19. Differentiate with respect to x .

$$y = (2x^2 - 3x + 4)(x^3 - x^2 + 5)$$

20. Differentiate with respect to x .

$$y = \sqrt[4]{(x^2 + 3x)}$$

21. Differentiate with respect to x .

$$\frac{1}{(x^2 - 3x + 4)^{\frac{1}{3}}}$$

22. Differentiate with respect to x .

$$\frac{1}{(x^2 - 3)^{-\frac{2}{3}}}$$

23. In a group of 80 people, 45 like playing soccer and 55 like playing basketball. If everyone in the group likes at least one of the two sports, how many people like both soccer and basketball?

24. In a survey of 100 students, 70 enjoy reading books and 60 enjoy watching movies. If each student enjoys at least one of the activities, how many students like both reading books and watching movies?

25. In a survey conducted with 300 participants, it was found that 180 participants owned a laptop, 220 participants owned a smartphone, and 120 participants owned a tablet. Among them, 80 participants owned both a laptop and a smartphone, 70 participants owned both a smartphone and a tablet, and 50 participants owned both a laptop and a tablet. Additionally, 30 participants owned all three devices. How many participants owned none of the three devices?

26. In a study involving 400 individuals, it was found that 200 individuals enjoyed playing video games, 250 individuals enjoyed watching movies, and 150 individuals enjoyed reading books. Among them, 100 individuals enjoyed both playing video games and watching movies, 90 individuals enjoyed both watching movies and reading books, and 60 individuals enjoyed both

playing video games and reading books. Furthermore, 20 individuals enjoyed all three activities. How many individuals enjoyed none of the three activities?

27. $f(x) = 3x + 4$

$$g(x) = 2x^2 + 3x + 4$$

Find, $f(g(x))$ and $g(f(x))$.

28. Find $f(g(x))$.

$$f(x) = x + 1 \text{ and } g(x) = \frac{3x+5}{x-1}$$

29. $f(x) = 5x - 7$ find $f^{-1}(x)$

30. $f(x) = 3x + 4$ find $f^{-1}(x)$

31. Find $f^{-1}(x)$. $f(x) = \frac{3x+1}{x-1}$

32. The average weight of a sample of 50 apples is 150 grams, with a standard deviation of 10 grams. The apples are then dried in an oven, causing their weights to decrease by 20%. Find the new average weight and standard deviation of the dried apples.

33. The average test score of a class of 80 students is 75, with a standard deviation of 5. To reward their efforts, each student's score is increased by 10 points. Determine the new average score and standard deviation of the class.