

Questions from Old Exams

1 Section 9.1

1. If the cost in thousands of SR of two computers and three printers is 7.5 and the cost of one computer and four printers is 5, then find the cost of three computers and six printers.
2. If (x, y) is a solution of the system $\begin{cases} 2\sqrt{2}x + 3\sqrt{5}y = 7 \\ 3\sqrt{2}x - \sqrt{5}y = -17 \end{cases}$, then find the value of y .
3. Find the value of the constant k for which the system of equations: $\begin{cases} x + kz = 1 \\ y + z = 2 \\ 2x + y = 5 \end{cases}$ has no solution.
4. If $x = a$ and $y = b$ satisfy the system of equations $\begin{cases} \frac{1}{x} - \frac{2}{y} = 3 \\ \frac{3}{x} + \frac{4}{y} = 14 \end{cases}$, then find $a + b$.
5. If the system of linear equations $\begin{cases} x + ky = 5 \\ 3x + 5y = 0 \end{cases}$ is inconsistent, then find k .
6. In a certain triangle, the largest angle is 20° less than the sum of the other two angles. Also, the largest angle is 10° less than twice of the smallest angle, then find the largest angle. [Hint: The sum of the three angles in a triangle is 180°].
7. Find the values of a for which the system $\begin{cases} u + 2v = 1 \\ 2u + a^2v = a \end{cases}$ has exactly one solution.
8. If the parabola $y = ax^2 + bx + c$ contains the points $(0, 1)$, $(1, 4)$, and $(-1, 2)$, then find $a + b + c$.
9. If $(x, y, z) = (a, b, c)$ is the solution of the following system of equations, then what is the value of $a + b + c$? $\begin{cases} 4x + 8y + 6z = 1 \\ x + 2y + z = 0 \\ x + y - 2z = -1 \end{cases}$
10. The solution of the following system is $(x, y, z) = (a, b, c)$: $\begin{cases} x - \frac{1}{y} + \frac{2}{z} = 1 \\ 3x + \frac{2}{y} + \frac{4}{z} = 4 \\ \frac{1}{y} + \frac{2}{z} = 5 \end{cases}$.
What is the value of abc ?
11. Find the solution set of the system $\begin{cases} 2x - y + 3z = 9 \\ 3x + y + 2z = 11 \\ x - y + z = 2 \end{cases}$.

12. Find the value of k for which the system $\begin{cases} 3x - 2y + 1 = 0 \\ x + ky = 0 \end{cases}$ has no solution.
13. Find the solution set of the system $\begin{cases} \frac{1}{x} - \frac{1}{y} = \frac{7}{10} \\ \frac{3}{x} + \frac{5}{y} = \frac{1}{2} \end{cases}$.
14. Find the solution set of the system $\begin{cases} \frac{2}{x+2} + \frac{1}{1-y} = 1 \\ \frac{1}{x+2} + \frac{1}{y-1} = 11 \end{cases}$.
15. Find the solution set of the system $\begin{cases} 4x + y + z = 6 \\ 2x - y = 0 \end{cases}$.
16. Find the solution set of the system $\begin{cases} x + y - z = 6 \\ 2x - y + z = -9 \\ x - 2y + 3z = 1 \end{cases}$.
17. Find the value of k for which the system $\begin{cases} -x + ky + 3 = 0 \\ 5x - 4y = 0 \end{cases}$ is inconsistent.
18. Find the values of k_1 and k_2 for which the system $\begin{cases} 2x + 5y + k_1 = 0 \\ 3x - k_2y = 2 \end{cases}$ has infinitely many solutions.
19. If (x, y) is a solution of the system $\begin{cases} 2x + y = 4 \\ 3x - 2y = -1 \end{cases}$, then (x, y) satisfies
- $x^2 + 2y^2 = 8$
 - $2x^2 - y^2 = -2$
 - $x^2 + y^2 = 3$
 - $x + y = -3$
 - $3x - 2y = 1$
20. Find the solution set of the system $\begin{cases} \frac{3}{\sqrt[3]{x}} + \frac{4}{\sqrt[3]{y}} = -1 \\ \frac{2}{\sqrt[3]{x}} - \frac{3}{\sqrt[3]{y}} = -3 \end{cases}$.
21. Consider the following system $\begin{cases} x + 2y - z = 2 \\ 3x - y + mz = -7 \\ 5x + 3y = n \end{cases}$ where m and n are real numbers. Which one of the following is TRUE?
- The system has infinite number of solutions if $m = 2$ and $n = -3$.
 - The system has no solution if $m = 2$ and $n = -3$.
 - The system is independent if $m = 2$ and $n = -3$.
 - The system has a single solution if $m = 2$ and $n \neq -3$.

(e) The system is inconsistent if $m = 2$ and $n \neq \frac{13}{10}$.

22. If $(a, b - c, b + c)$ is the solution of the system $\begin{cases} x + 3y + 2z = 1 \\ y + z = 0 \\ z = 1 \end{cases}$, then find the values of a , b , and c .

23. Which of the following is TRUE about the system $\begin{cases} x + y + z = 1 \\ x - y = 0 \\ y + z = 2 \end{cases}$

- (a) The system is inconsistent.
- (b) The system has a unique solution.
- (c) The system has infinite number of solutions.
- (d) The system has two solutions.
- (e) The system has three solutions.

24. Find the solution set of the system $\begin{cases} y = e^x - 5 \\ y = -2e^x + 1 \end{cases}$.

2 Section 9.3

1. Find the values of k for which the line $x + y = k$ and the curve $xy = 1$ have no points in common.

2. Find the value(s) of k such that the graphs of the equations $x + y = k$ and $xy = 1$ has one point in common.

3. Find the set of values of k for which the system of equations $\begin{cases} 2x^2 + y^2 = 6 \\ y - x = 3k \end{cases}$ has only one solution.

4. For real x and y , find the solution set of the system $\begin{cases} x^4 - y^4 = 0 \\ x^2 + 2xy + 3y^2 = 6 \end{cases}$.

5. The following system has $\begin{cases} (x + 1)^2 + 2(y - 2)^2 = 10 \\ 2(x + 1)^2 + 3(y - 2)^2 = 16 \end{cases}$

- (a) three real solutions
- (b) one real solution
- (c) no real solutions
- (d) two real solutions
- (e) four real solutions

6. If the straight line $x - y = -2$ intersects the ellipse $3x^2 + 2y^2 = 5$ at the points (a, b) and (c, d) , then find $a + b + c + d$.

7. Consider the system $\begin{cases} y - x^2 + 9 = 0 \\ y + x^2 - k = 0 \end{cases}$ where x , y , and k are real numbers. Find the values of k for which the system has exactly two different solutions.
8. Find the value of b such that the straight line $3x - y = b$ touches the circle $x^2 + y^2 = 25$ at only one point.
9. Consider the equations $\begin{cases} (x - 1)^2 + 2(y - 2)^2 = 2 \\ (x - 2)^2 - (y - 2)^2 = 2 \end{cases}$ where x and y are real numbers. Find the solution set of the system.
10. Let C be the circle $x^2 + y^2 = 9$ and L be the line $x + 2y = 7$. Which one of the following is TRUE?
- L and C have two points in common.
 - L and C have no points in common.
 - L touches C only at $(\sqrt{45}, \sqrt{3} - 1)$.
 - L touches C only at $(\sqrt{3} - 1, \sqrt{35})$.
 - L touches C only at $(\sqrt{35}, \frac{7 - \sqrt{35}}{2})$.
11. Find the points of intersection (if any) of the graphs of the line $3x - y = 0$ and the hyperbola $9x^2 - 4y^2 = 36$.
12. Mr. X and Mr. Y start doing their homework problems at the same time. Mr. X will finish 9 hours before Mr. Y. Mr. X is twice as fast as Mr. Y. How long will it take them to finish the homework if they do the problems together?
13. Find the points of intersection of the graphs of the equations $x^2 + y^2 = 9$ and $x^2 - y^2 = 1$.
14. Find the points of intersection of the graphs of the equations $(x - 1)^2 + y^2 = 4$ and $x^2 - y^2 = 1$.