

Solve the system of linear equations using Gaussian elimination.

1. 
$$\begin{cases} 7x - 3y + 7z = -32 \\ 5x - 5y - 3z = 8 \\ x - 4y + 7z = -62 \end{cases}$$

- [A]  $(8a + 6, 9a - 7, a)$  [B]  $(4, 7, 5)$  [C]  $(4, 6, -6)$  [D]  $(4, 6, -7)$

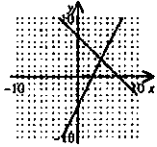
2. 
$$\begin{cases} -x + y + z = 3 \\ -3x + 2y + 5z = 9 \\ 3x - 2y - 5z = -9 \end{cases}$$

- [A]  $(2, 1, -3)$  [B]  $(-3, 3, 2)$  [C]  $(3a - 3, 2a, a)$  [D] No solution

3. Solve the system graphically.

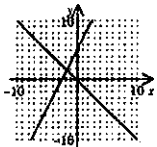
$$\begin{cases} x + y = 7 \\ 2x - y = 5 \end{cases}$$

[A]



$(4, 3)$

[B]



$(\frac{5}{3}, \frac{5}{3})$

5. Find the minimum and maximum values of the objective function and where they occur, subject to the indicated constraints.

Objective function:

$z = 2x + 6y$

Constraints:

$x + y \geq 1$

$5x - 6y \leq 5$

$-4x + 7y \leq 7$

- [A] Minimum at  $(1, 0)$ : 2  
Maximum at  $(7, 3)$ : 32  
[B] Minimum at  $(0, 1)$ : 2  
Maximum at  $(7, 3)$ : 32  
[C] Minimum at  $(1, 0)$ : 2  
Maximum at  $(5, 7)$ : 44  
[D] Minimum at  $(1, 0)$ : 2  
Maximum at  $(7, 5)$ : 44

6. Find the consumer surplus and producer surplus for the given demand and supply equations.

$p = 380 - 0.08x$  Demand equation

$p = 335 + 0.071x$  Supply equation

- [A] Consumer surplus: \$3152.82  
Producer surplus: \$3552.48  
[B] Consumer surplus: \$356.16  
Producer surplus: \$356.16  
[C] Consumer surplus: \$3552.48  
Producer surplus: \$3152.82  
[D] Consumer surplus: \$7104.95  
Producer surplus: \$6305.64

7. Find the sum of the maximum and minimum values of the objective function subject to the indicated constraints.

Objective function:

$z = 27x + 18y$

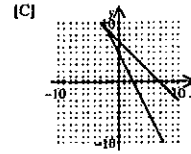
Constraints:

$2x + 3y \geq 6$

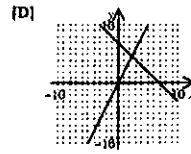
$3x + 3y \leq 9$

$-x + 6y \leq 12$

- [A] 252 [B] 216 [C] 180 [D] 247



$(-2, 9)$



$(\frac{7}{3}, \frac{14}{3})$

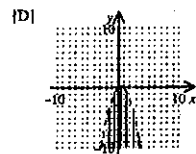
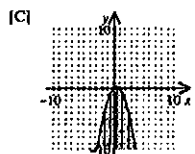
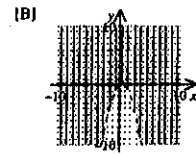
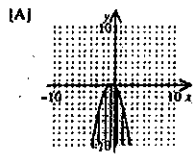
(3.)

4. Solve the system of linear equations.

$$\begin{cases} 3x + 4y + 5z = 8 \\ -15x + 8y + 15z = -16 \end{cases}$$

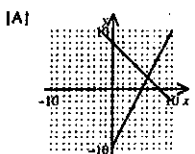
- [A]  $(\frac{5}{21}a - \frac{32}{21}, \frac{10}{7}a - \frac{6}{7}, a)$  [B]  $(\frac{5}{21}a + \frac{32}{21}, -\frac{10}{7}a + \frac{6}{7}, a)$   
[C]  $(-\frac{5}{21}a + \frac{32}{21}, \frac{10}{7}a + \frac{6}{7}, a)$  [D]  $(\frac{5}{21}a - \frac{32}{21}, -\frac{10}{7}a - \frac{6}{7}, a)$

8. Identify the graph of the inequality.  
 $y \leq -x^2 + x$

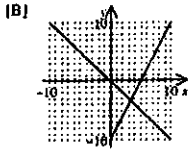


9. Identify the graph of system. Use the graph to determine if the system is consistent or inconsistent. If the system is consistent, determine the number of solutions.

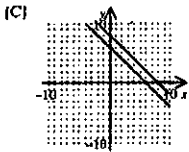
$$\begin{cases} x + y = 8 \\ y = 2x - 10 \end{cases}$$



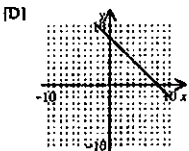
Consistent, one solution



Consistent, infinitely many solutions



Inconsistent



Consistent, infinitely many solutions

(9.)

10. Use back-substitution to solve the system of linear equations.

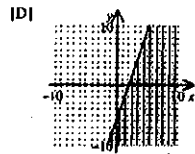
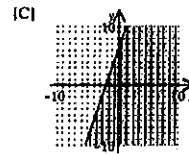
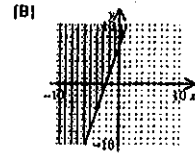
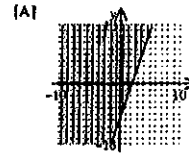
$$\begin{cases} 8x + 5y + 3z = 7 \\ y + 7z = 3 \\ z = 4 \end{cases}$$

- [A] (15, -25, 4) [B] (-15, -25, 4) [C] (5, -9, 4) [D]  $(-\frac{15}{4}, 5, 4)$

11. The perimeter of a rectangular concrete slab is 68 feet and its area is 253 square feet. What is the length of the longer side of the slab?

- [A] 24 ft [B] 25 ft [C] 23 ft [D] 26 ft

12. Identify the graph of the inequality.  
 $y \leq 3x - 6$



13. Solve the system by the method of substitution.

$$\begin{cases} x + 2y = -7 \\ x + y = -3 \end{cases}$$

- [A] (2, -5) [B]  $(-4, -\frac{3}{2})$  [C] (1, -4) [D] (-3, -1)

14. Solve the system by elimination.

$$\begin{cases} 6x + 8y = -60 \\ x - 8y = -38 \end{cases}$$

- [A] (-60, 3) [B] (-14, 3) [C]  $(a, 3a + 2)$  [D] No solution

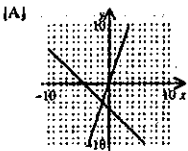
15. Solve the system by the method of substitution.

$$\begin{cases} x + 2y = -4 \\ x + y = -3 \end{cases}$$

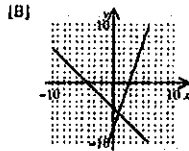
- [A] (-2, -1) [B] (-2, -5) [C]  $(-1, -\frac{3}{2})$  [D] (-1, -4)

16. Solve the system graphically.

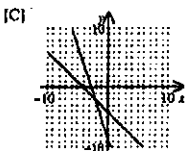
$$\begin{cases} x + y = -4 \\ 3x - y = 8 \end{cases}$$



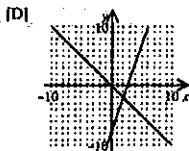
(-1, -3)



(1, -5)



(-2, -2)



(2, -2)

17. Solve the system by elimination.

$$\begin{cases} 4x - 4y = -12 \\ 3x + 4y = -16 \end{cases}$$

- [A] (-4, -1) [B]  $(a, 3a + 2)$  [C] (-12, -1) [D]  $(a, 4a + 4)$

18. The length of a rectangle is 3 cm less than three times its width. If the area is 18 cm<sup>2</sup>, find the dimensions of the rectangle.

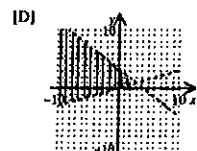
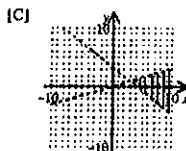
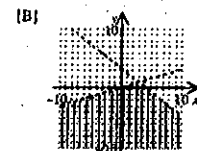
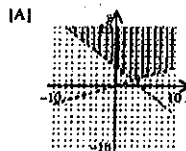
- [A] 6 cm x 3 cm [B] 21 cm x 15 cm [C] 54 cm x 6 cm [D] 6 cm x 4 cm

19. A small fish market sells only tuna and salmon. A tuna costs the fish market \$0.75 per pound to buy and \$2.53 per pound to clean and package. A salmon costs the fish market \$3.00 per pound to buy and \$2.75 per pound to clean and package. The fish market makes \$2.50 per pound profit for each tuna it sells and \$2.00 per pound profit for each salmon it sells. The fish market owner can spend only \$159.00 per day to buy fish and \$197.34 per day to clean and package the fish. What is the maximum profit the owner can make per day and how much of each type of fish can she buy?

- [A] 78 pounds of tuna  
No salmon  
\$195.00 maximum profit per day  
[B] No tuna  
53 pounds of salmon  
\$106.00 maximum profit per day  
[C] 28 pounds of tuna  
46 pounds of salmon  
\$162.00 maximum profit per day  
[D] None of these

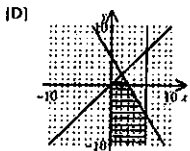
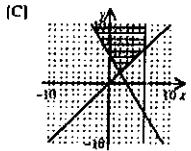
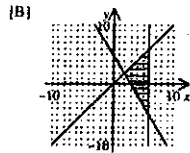
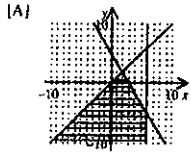
20. Which is the shaded region representing the solution of the system?

$$\begin{cases} 8x + 10y > 34 \\ -3x + 10y > 1 \end{cases}$$



21. Which is the shaded region representing the solution of the system?

$$\begin{cases} 5x + 3y \geq 15 \\ x \leq y \\ x \leq 6 \end{cases}$$



22. A group of 48 people attend a ball game. There were twice as many children as adults in the group. Set up a system of equations that represents the numbers of adults and children that attended the game and solve the system to find the number of children that were in the group.

(A) $\begin{cases} a + c = 48 \\ c = 2a \end{cases}$	(B) $\begin{cases} a + c = 48 \\ c + 2a = 48 \end{cases}$	(C) $\begin{cases} a + c = 48 \\ c + 2a = 48 \end{cases}$	(D) $\begin{cases} a + c = 48 \\ c = 2a \end{cases}$
32 children	16 children	32 children	16 children

Reference: [7.3.2.36]

(1) [C]

Reference: [7.3.2.37]

(2) [C]

Reference: [7.1.2.6]

(3) [A]

Reference: [7.3.3.41]

(4) [B]

Reference: [7.5.1.77]

(5) [D]

Reference: [7.4.3.71]

(6) [C]

Reference: [7.5.1.76]

(7) [A]

Reference: [7.4.1.61]

(8) [C]

Reference: [7.2.2.21]

(9) [A]

Reference: [7.3.1.31]

(10) [A]

Reference: [7.1.3.12]

(11) [C]

Reference: [7.4.1.62]

(12) [D]

Reference: [7.1.1.1]

(13) [C]

Reference: [7.2.1.17]

(14) [B]

Reference: [7.1.1.2]

(15) [A]

Reference: [7.1.2.7]

(16) [B]

Reference: [7.2.1.16]

(17) [A]

Reference: [7.1.3.11]

(18) [A]

Reference: [7.5.2.81]

(19) [A]

Reference: [7.4.2.67]

(20) [A]

Reference: [7.4.2.66]

(21) [C]

Reference: [7.2.3.26]

(22) [A]