

Chapter 9 Quiz, Part II (Sections 5 – 9)

_____ 1. Perform the matrix operation: $\begin{bmatrix} 8 & 4 & 2 \\ 1 & 2 & 5 \\ 5 & 4 & 8 \end{bmatrix} \begin{bmatrix} 6 & -4 & 1 \\ 9 & 5 & 0 \end{bmatrix}$

a. $\begin{bmatrix} 1 & 8 & 8 & 2 \\ 6 & 4 & 3 & 5 \\ 4 & 4 & 9 & 8 \end{bmatrix}$

b. $\begin{bmatrix} 4 & 5 \\ 4 & 9 \end{bmatrix}$

c. $\begin{bmatrix} 4 & 1 & 1 \\ 4 & 6 & 0 \end{bmatrix}$

d. The matrix operation is impossible.

e. $\begin{bmatrix} 4 & 8 & 8 \\ 6 & 5 & 3 \\ 6 & 8 & 7 \end{bmatrix}$

_____ 2. Perform the matrix operation: $\begin{bmatrix} 1 & 3 \\ -3 & 3 \end{bmatrix} \begin{bmatrix} 1 & -2 & 4 \\ 2 & 2 & -1 \end{bmatrix}$

a. $\begin{bmatrix} 7 & 4 & 1 \\ 3 & 12 & -15 \end{bmatrix}$

b. $\begin{bmatrix} 8 & 5 & 0 \\ 3 & 12 & -14 \end{bmatrix}$

c. The matrix operation is impossible.

d. $\begin{bmatrix} 7 & 4 & 0 \\ 3 & 12 & -14 \end{bmatrix}$

e. $\begin{bmatrix} 8 & 5 & 1 \\ 3 & 12 & -15 \end{bmatrix}$

_____ 3. Solve the matrix equation $5(X - B) = A$ for the unknown matrix X , if

$$A = \begin{bmatrix} 10 & 40 \\ 30 & 35 \\ 5 & 0 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 0 & 10 \\ 8 & 2 \\ 10 & 3 \end{bmatrix}.$$

a. No solution

b. $\begin{bmatrix} 2 & 8 \\ 6 & 7 \\ 1 & 0 \end{bmatrix}$

c. $\begin{bmatrix} 2 & -2 \\ -2 & 5 \\ -9 & -3 \end{bmatrix}$

d. $\begin{bmatrix} 2 & 18 \\ 14 & 9 \\ 11 & 3 \end{bmatrix}$

e. $\begin{bmatrix} 10 & 50 \\ 38 & 37 \\ 15 & 3 \end{bmatrix}$

_____ 4. Find $2A - 8B$ if $A = \begin{bmatrix} 2 & \frac{1}{2} & 1 \\ 5 & -6 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -\frac{9}{2} & 0 \\ 1 & 4 & -4 \end{bmatrix}$.

a. $\begin{bmatrix} 2 & \frac{1}{2} & 1 \\ 5 & -6 & 5 \end{bmatrix}$

b. $\begin{bmatrix} -20 & 37 & 2 \\ 2 & -44 & 42 \end{bmatrix}$

c. $\begin{bmatrix} -20 & 2 \\ 37 & -44 \\ 2 & 42 \end{bmatrix}$

d. $\begin{bmatrix} 4 & 1 & 2 \\ 10 & -12 & 10 \end{bmatrix}$

_____ 5. Find AB if $A = \begin{bmatrix} 10 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -7 \\ 0 & 3 \end{bmatrix}$.

a. $\begin{bmatrix} 10 & -70 \\ 0 & 12 \end{bmatrix}$

b. $\begin{bmatrix} 10 \\ -58 \end{bmatrix}$

c. $\begin{bmatrix} 10 & 4 \end{bmatrix}$

d. $\begin{bmatrix} 10 & -28 \\ 0 & 3 \end{bmatrix}$

e. $\begin{bmatrix} 10 & -58 \end{bmatrix}$

_____ 6. Which of the products AB and BA are defined, if $A = \begin{bmatrix} 7 & 5 & -2 \\ 10 & -6 & 10 \end{bmatrix}$ and $B = \begin{bmatrix} -10 & 3 & 4 \\ 6 & 8 & 8 \\ -3 & 10 & -4 \end{bmatrix}$.

a. AB

b. BA

_____ 7. Find $C(AB)$ if $A = \begin{bmatrix} 7 & 0 \\ 10 & -4 \end{bmatrix}$, $B = \begin{bmatrix} -6 & 6 & 5 \\ 6 & \frac{1}{4} & -4 \end{bmatrix}$ and $C = \begin{bmatrix} 6 & 16 \end{bmatrix}$.

a. $\begin{bmatrix} -1,596 & 1,196 & 1,266 \end{bmatrix}$

b. $\begin{bmatrix} -36 & 36 & 30 \\ 96 & 4 & -64 \end{bmatrix}$

c. $\begin{bmatrix} -1,596 \\ 1,196 \\ 1,266 \end{bmatrix}$

d. $\begin{bmatrix} -42 & 42 & 35 \\ -84 & 59 & 66 \end{bmatrix}$

e. $\begin{bmatrix} -84 & 59 & 66 \end{bmatrix}$

_____ 8. Write this system of equations as a matrix equation:

$$\begin{cases} -5x - 3y + 2z = -17 \\ -3x + 5y = -1 \\ -4x - 7z = 6 \end{cases}$$

a.
$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} \begin{bmatrix} -5 & -3 & -4 \\ -3 & 5 & 0 \\ 2 & 0 & -7 \end{bmatrix} = \begin{bmatrix} -17 \\ -1 \\ 6 \end{bmatrix}$$

b.
$$\begin{bmatrix} -5 & 3 & 2 \\ 3 & 5 & 0 \\ 4 & 0 & 7 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -17 \\ -1 \\ 6 \end{bmatrix}$$

c.
$$\begin{bmatrix} -5 & -3 & -4 \\ -3 & 5 & 0 \\ 2 & 0 & -7 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 6 \\ -1 \\ -17 \end{bmatrix}$$

d.
$$\begin{bmatrix} -5 & -3 & 2 \\ -3 & 5 & 0 \\ -4 & 0 & -7 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -17 \\ -1 \\ 6 \end{bmatrix}$$

e.
$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} \begin{bmatrix} -5 & -3 & 2 \\ -3 & 5 & 0 \\ -4 & 0 & -7 \end{bmatrix} = \begin{bmatrix} -17 \\ -1 \\ 6 \end{bmatrix}$$

_____ 9. Find the inverse of the matrix:
$$\begin{bmatrix} 8 & 5 \\ 3 & 2 \end{bmatrix}$$

a.
$$\begin{bmatrix} 2 & -3 \\ -5 & 8 \end{bmatrix}$$

b.
$$\begin{bmatrix} 2 & -5 \\ -3 & 8 \end{bmatrix}$$

c.
$$\begin{bmatrix} 8 & -3 \\ -5 & 2 \end{bmatrix}$$

d.
$$\begin{bmatrix} 8 & 3 \\ 5 & 2 \end{bmatrix}$$

_____ 10. Find the inverse of the matrix: $\begin{bmatrix} 1.6 & -1.9 \\ 1.9 & 1.8 \end{bmatrix}$

a. $\begin{bmatrix} 1.8 & 1.9 \\ -1.9 & 1.6 \end{bmatrix}$

b. $\begin{bmatrix} 0.3 & -0.3 \\ 0.3 & 0.2 \end{bmatrix}$

c. $\begin{bmatrix} 0.3 & 0.3 \\ -0.3 & 0.2 \end{bmatrix}$

d. $\begin{bmatrix} 1.6 & 1.9 \\ -1.9 & 1.8 \end{bmatrix}$

_____ 11. Find the inverse of the matrix: $\begin{bmatrix} 2 & 4 & 1 \\ -1 & 1 & -1 \\ 1 & 4 & 0 \end{bmatrix}$

a. $\begin{bmatrix} -4 & -4 & 5 \\ 1 & 1 & -1 \\ 5 & 4 & -6 \end{bmatrix}$

b. $\begin{bmatrix} -4 & 5 & -1 \\ 1 & 5 & 1 \\ 5 & -6 & -4 \end{bmatrix}$

c. $\begin{bmatrix} 5 & -4 & -6 \\ 1 & -1 & -4 \\ 4 & 4 & -6 \end{bmatrix}$

d. $\begin{bmatrix} -4 & 1 & -4 \\ -4 & 1 & -1 \\ 5 & 1 & 4 \end{bmatrix}$

_____ 12. Find the inverse of the matrix $\begin{bmatrix} 0 & 0 & -2 & 1 \\ -1 & 0 & 1 & 1 \\ 0 & 1 & -1 & 0 \\ 1 & 0 & 0 & -1 \end{bmatrix}$

a. $\begin{bmatrix} 1 & 2 & 0 & 3 \\ 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 \\ 1 & 2 & 0 & 2 \end{bmatrix}$

b. $\begin{bmatrix} 0 & 3 & 1 & 3 \\ 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 1 & 2 & 1 & 2 \end{bmatrix}$

c. $\begin{bmatrix} 1 & 2 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 1 & 2 & 3 & 1 \end{bmatrix}$

d. $\begin{bmatrix} 1 & 1 & 2 & 2 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 \\ 1 & 2 & 0 & -1 \end{bmatrix}$

_____ 13. Find the inverse of the matrix: $\begin{bmatrix} e^x & -e^{2x} \\ e^{2x} & e^{3x} \end{bmatrix}$

a. $\begin{bmatrix} \frac{1}{2e^x} & \frac{1}{2e^{2x}} \\ -\frac{1}{2e^{2x}} & \frac{1}{2e^{3x}} \end{bmatrix}$

b. $\begin{bmatrix} \frac{e^x}{2} & \frac{e^{2x}}{2} \\ -\frac{e^{2x}}{2} & \frac{e^{3x}}{2} \end{bmatrix}$

c. $\begin{bmatrix} e^x & e^{2x} \\ -e^{2x} & e^{3x} \end{bmatrix}$

d. $\begin{bmatrix} e^{3x} & e^{2x} \\ -e^{2x} & e^x \end{bmatrix}$

_____ 14. Find the determinant of the matrix: $\begin{bmatrix} 9 & 5 \\ 4 & 3 \end{bmatrix}$

- a. 7
- b. 27
- c. -7
- d. -9
- e. 47

_____ 15. Find the determinant of the matrix: $A = \begin{bmatrix} 10 & 0 & 50 \\ 60 & 50 & 60 \\ 40 & 10 & 50 \end{bmatrix}$

- a. $D = -55,000$
- b. $D = -54,000$
- c. $D = -52,000$
- d. $D = -51,000$
- e. $D = -53,000$

_____ 16. Use Cramer's Rule to solve the system:
$$\begin{cases} 6x_1 + 8x_2 - 9x_3 = 87 \\ x_1 + x_2 - x_3 = 12 \\ 7x_2 + x_3 = 64 \end{cases}$$

- a. $x_1 = 4, x_2 = 9, x_3 = 1$
- b. $x_1 = -1, x_2 = 9, x_3 = -4$
- c. $x_1 = 9, x_2 = -4, x_3 = 1$
- d. $x_1 = -1, x_2 = 4, x_3 = 9$
- e. $x_1 = 4, x_2 = -1, x_3 = 9$

_____ 17. Solve for x :
$$\begin{vmatrix} 1 & 0 & x \\ 4x^3 & \frac{1}{16} & 5 \\ x & 0 & 16 \end{vmatrix} = 0$$

- a. $x = 16$
- b. $x = \frac{1}{4}$
- c. $x = \frac{1}{4}, x = -\frac{1}{4}$
- d. $x = -4, x = 4$
- e. $x = 4, x = -4$

_____ 18. A roadside fruit stand sells apples at 75 cents a pound, peaches at 90 cents a pound, and pears at 60 cents a pound. Muriel buys 15 pounds of fruit at a total cost of \$12.00. Her peaches and pears together cost \$3.00 more than her apples. Solve a linear system for the number of pounds of apples, peaches, and pears that she bought using Cramer's Rule.

- a. apples: 6 pounds; peaches: 6 pounds; pears: 5 pounds
- b. apples: 6 pounds; peaches: 6 pounds; pears: 2 pounds
- c. apples: 7 pounds; peaches: 7 pounds; pears: 5 pounds
- d. apples: 7 pounds; peaches: 6 pounds; pears: 5 pounds
- e. apples: 6 pounds; peaches: 7 pounds; pears: 2 pounds

____ 19. Write the form of the partial fraction decomposition of $\frac{9}{(x^3 - 1)(x^2 - 1)}$, but do **not** determine the numerical values of the coefficients:

a. $\frac{A}{x-1} + \frac{B}{(x+1)^2} + \frac{C}{x+1} + \frac{Dx+E}{x^2-x-1}$

b. $\frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{C}{x+1} + \frac{Dx+E}{x^2+x+1}$

c. $\frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{C}{x+1} + \frac{Dx+E}{x^2-x+1}$

d. $\frac{A}{x+1} + \frac{B}{(x+1)^2} + \frac{C}{x-1} + \frac{Dx+E}{x^2+x+1}$

e. $\frac{A}{x+1} + \frac{B}{(x+1)^2} + \frac{C}{x-1} + \frac{Dx+E}{x^2-x+1}$

____ 20. Write the form of the partial fraction decomposition of $\frac{1}{(x-1)(x+9)}$. Do **not** determine the numerical values of the coefficients:

a. $\frac{A}{x-1} + \frac{Bx+C}{x+9}$

b. $\frac{B}{x+1} - \frac{B}{x+9}$

c. $\frac{1}{x-1} + \frac{1}{x+9}$

d. $\frac{A}{x-1} + \frac{1}{x+9}$

e. $\frac{A}{x-1} + \frac{B}{x+9}$

____ 21. Find the partial fraction decomposition of the rational function: $\frac{8x+27}{x(x+9)}$

a. $\frac{1}{x} + \frac{5}{x+9}$

b. $\frac{27}{x} - \frac{19}{x+1}$

c. $\frac{3}{x} + \frac{5}{x+9}$

d. $\frac{1}{x} - \frac{5}{x+9}$

e. $-\frac{3}{x} + \frac{5}{x+9}$

____ 22. Find the partial fraction decomposition of the rational function: $\frac{21x-4}{3x^2-x}$

a. $\frac{1}{x} + \frac{9}{3x-1}$

b. $\frac{9}{x} + \frac{4}{3x-1}$

c. $\frac{1}{x} + \frac{1}{3x-1}$

d. $\frac{4}{x} + \frac{9}{3x-1}$

e. $\frac{4}{x} + \frac{9}{x-3}$

____ 23. Find the partial fraction decomposition of the rational function: $\frac{-21x^2 - 172x - 119}{(x+5)(2x^2 + 19x + 9)}$

a. $-\frac{1}{x+5} + \frac{4}{x+9} + \frac{1}{2x+1}$

b. $-\frac{6}{x+5} - \frac{4}{x+9} - \frac{1}{2x+1}$

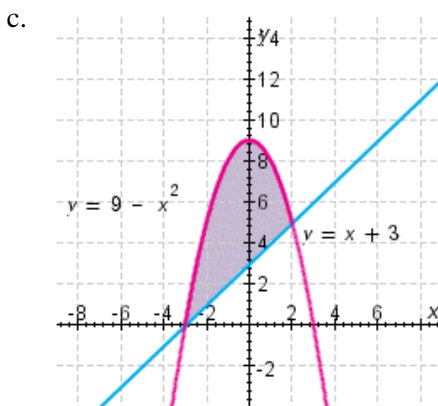
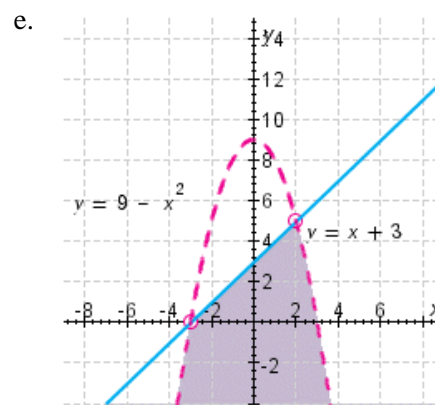
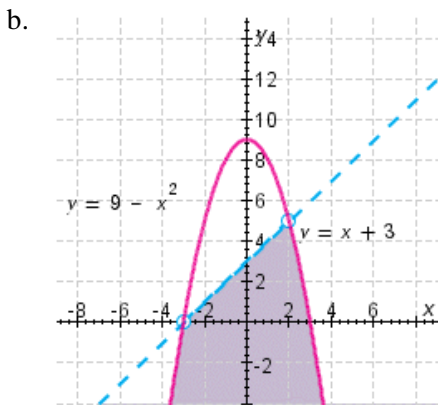
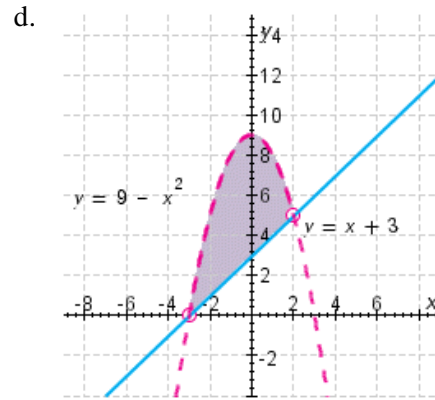
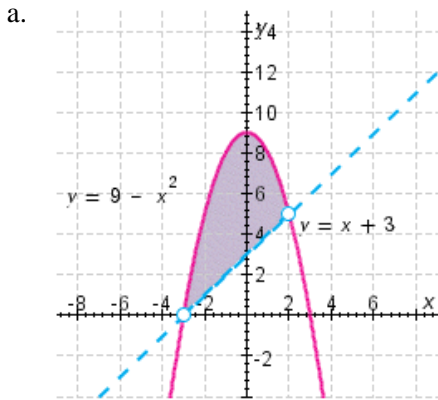
c. $-\frac{6}{x+5} - \frac{4}{x+9} - \frac{1}{2x-1}$

d. $-\frac{4}{x+5} - \frac{6}{x+9} - \frac{1}{2x+1}$

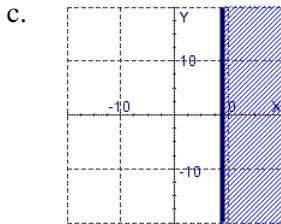
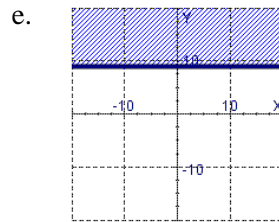
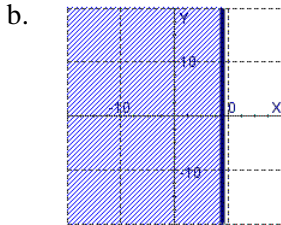
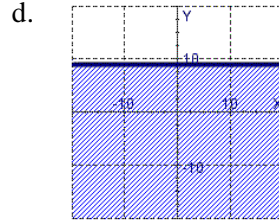
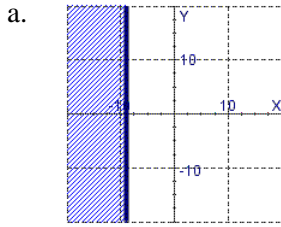
e. $\frac{6}{x+5} - \frac{4}{x+9} + \frac{1}{2x-1}$

24. Graph the solution of the system of inequalities:
$$\begin{cases} y < 9 - x^2 \\ y \geq x + 3 \end{cases}$$

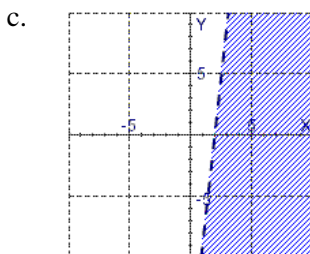
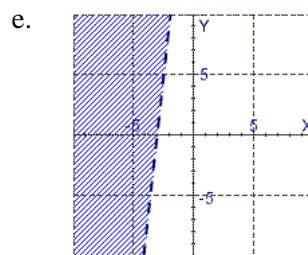
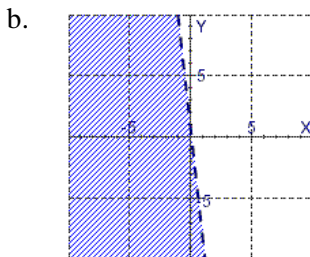
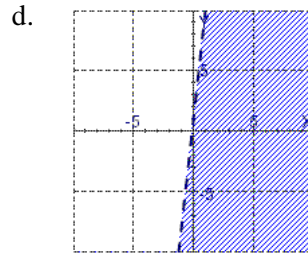
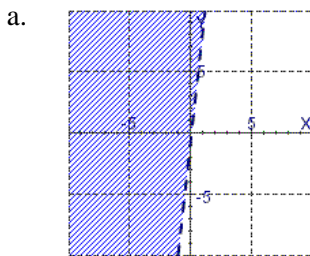
Find the coordinates of all vertices, and determine whether the solution set is bounded:



25. Which of the following graphs corresponds to the inequality $x \leq -9$?

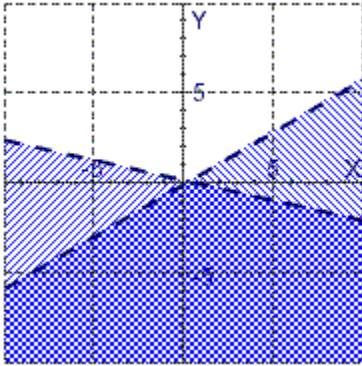


26. Which of the following graphs corresponds to the inequality $y < 9x + 1$?

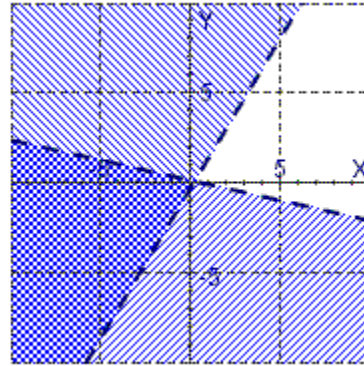


27. Solve the system of inequalities:
$$\begin{cases} 2x + 9y \geq 1 \\ 5x - 3y \leq 1 \end{cases}$$

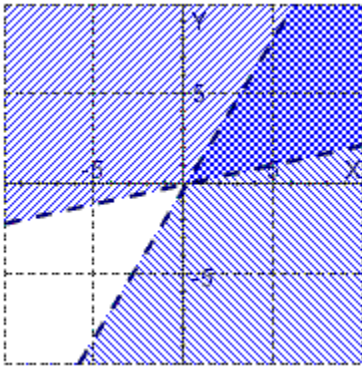
a.



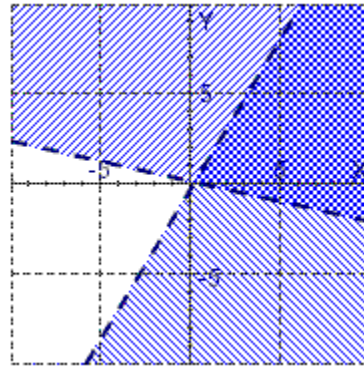
d.



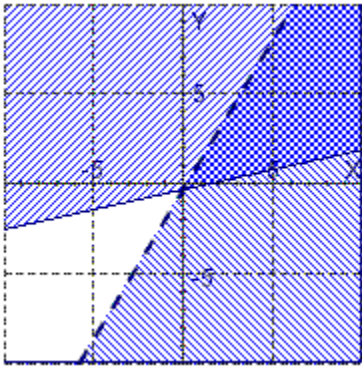
b.



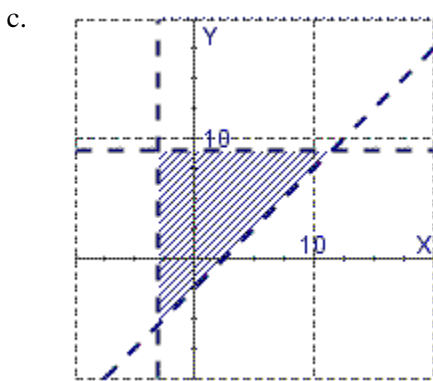
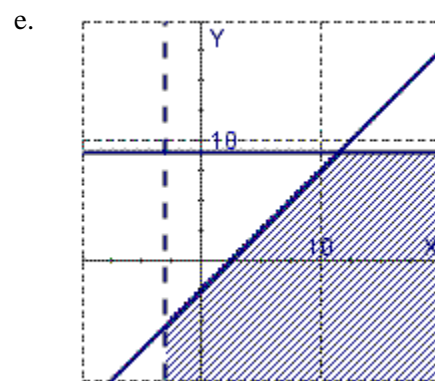
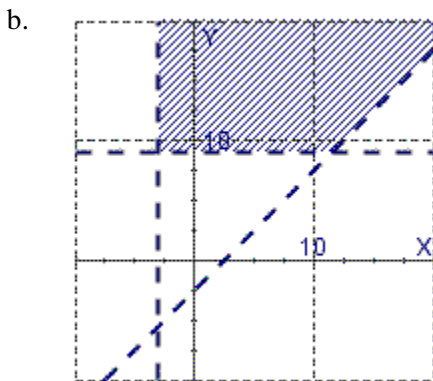
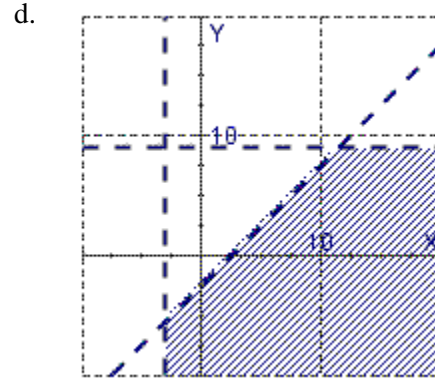
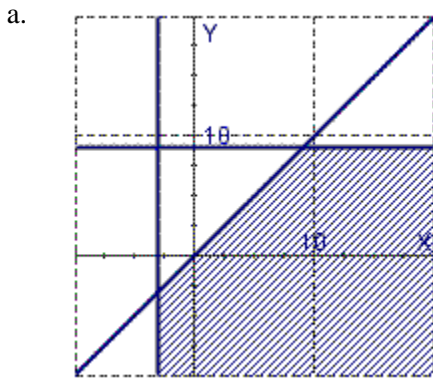
e.



c.



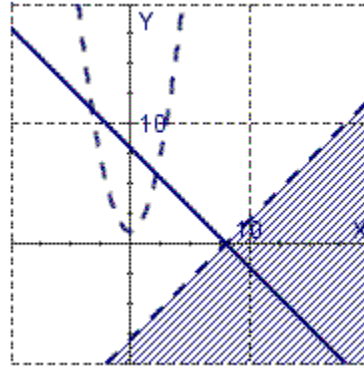
28. Solve the system of inequalities:
$$\begin{cases} x > -3 \\ y < 9 \\ 4x - 4y > 10 \end{cases}$$



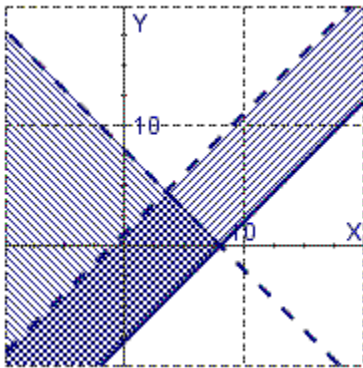
29. Solve the system of inequalities:
$$\begin{cases} x^2 - y \geq -1 \\ x + y < 8 \\ x - y < 8 \end{cases}$$

a. None of these.

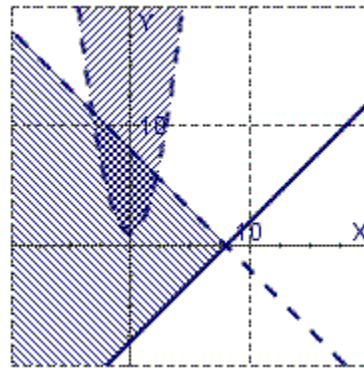
d.



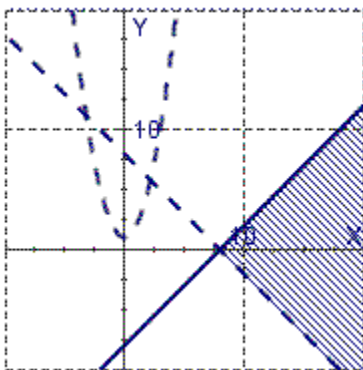
b.



e.



c.



30. Solve the system of inequalities:
$$\begin{cases} x^2 + y^2 \geq 25 \\ x \geq 6 \\ y \geq 0 \end{cases}$$

