

Precalculus-G11-Ch.6-Test

Indicate the answer choice that best completes the statement or answers the question.

1. Use Cramer's Rule to find the solution of the system of linear equations, if a unique solution exists.

$$-4x - y + z = -31$$

$$-3x - y + 3z = -29$$

$$-x + 2y - 2z = 8$$

- a. (4, -6, 6) b. (6, 5, -2)
c. (4, -3, -2) d. no unique solution

Find the maximum and minimum values of the objective function $f(x, y)$ and for what values of x and y they occur, subject to the given constraints.

2. $f(x, y) = 2x + 6y$

$$y \leq -5x - 4$$

$$y \geq 4x - 4$$

$$y \geq -5x + 59$$

- a. max at (7, 24) = 158, no min b. min at (0, -4) = -24, no max
c. min at (0, -4) = -24, d. max at (0, -4) = -24, no min
max at (7, 24) = 158

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3. Graph the region corresponding to the solution of the system of constraints.

$$f(x, y) = 3y + x$$

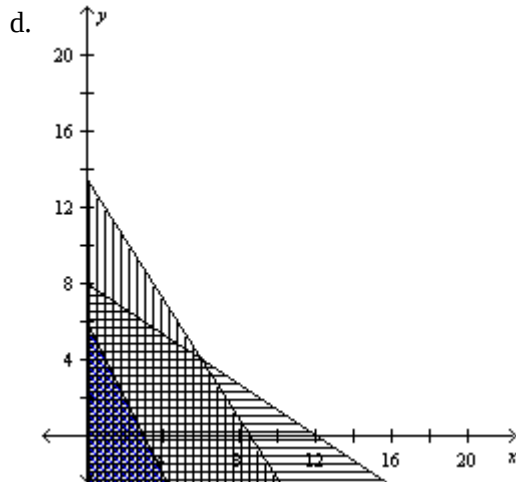
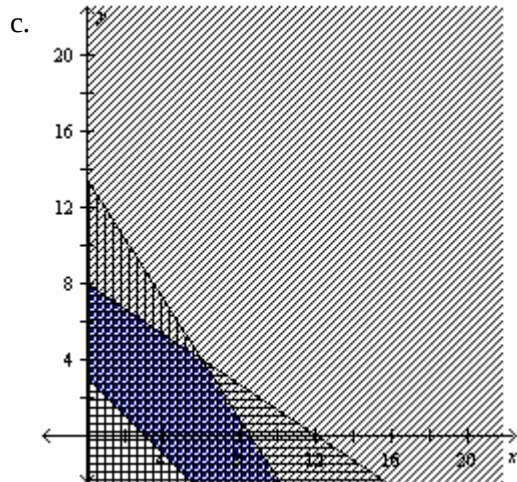
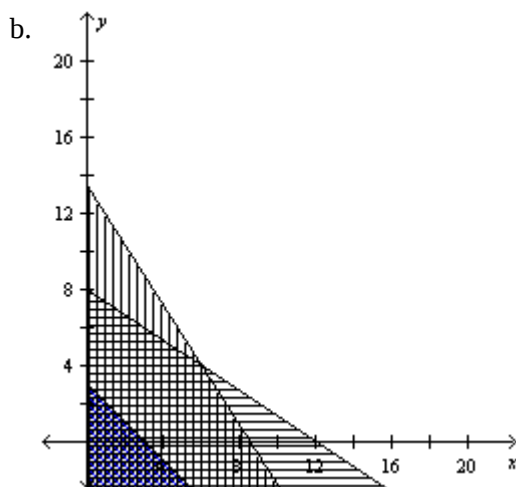
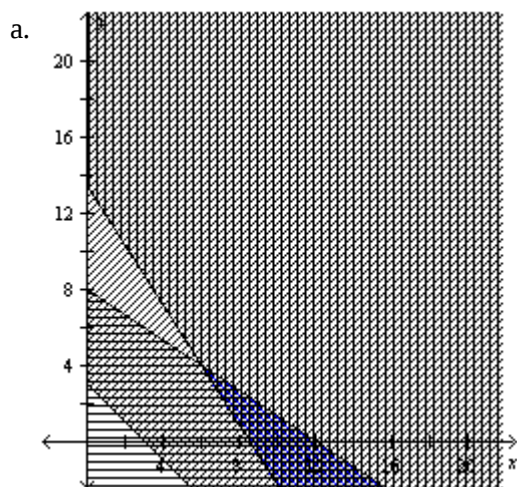
$$x \geq 0$$

$$y \geq -2$$

$$8x + 12y \leq 96$$

$$11x + 7y \leq 94$$

$$x + y \geq 3$$



4. Solve the system of equations.

$$-10x - 24y + 80z = 396$$

$$-2x - 7y + 27z = 103$$

$$21x + 72y - 276z = -1068$$

a. $x = -6, y = 7, z = 3$

b. $x = -8, y = -1, z = -1$

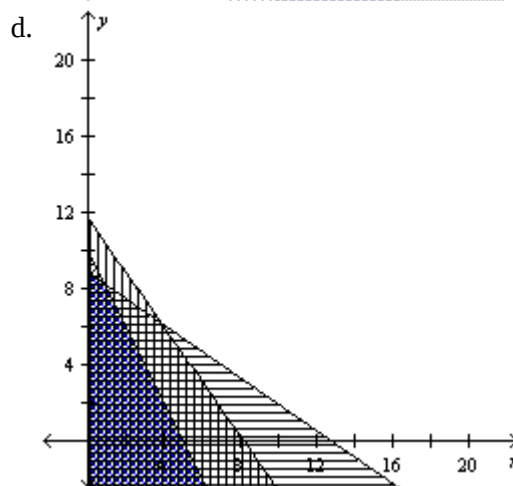
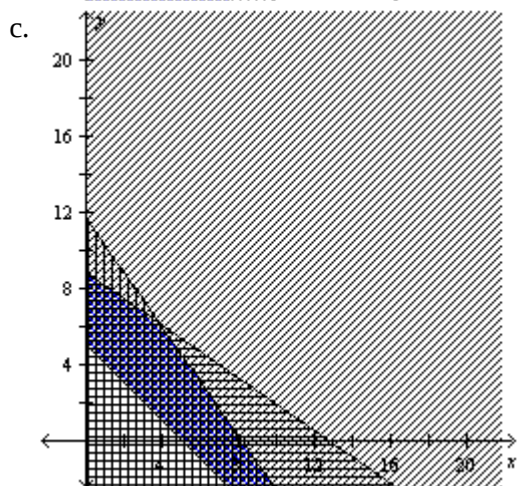
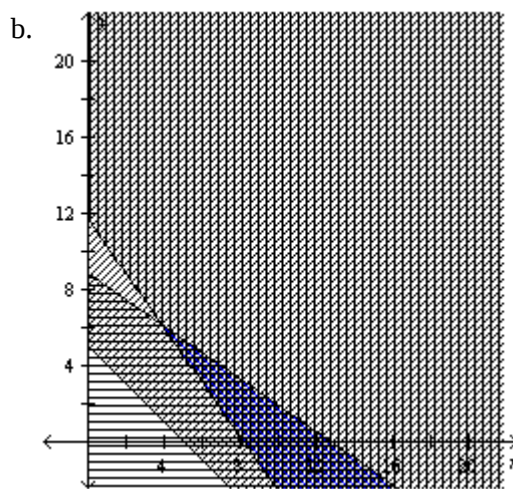
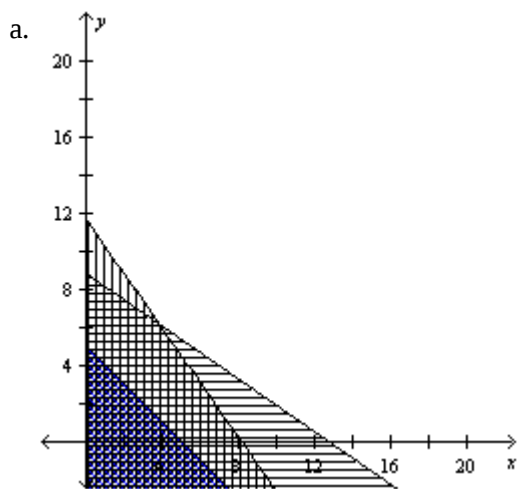
c. infinite solutions

d. no solution

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5. Graph the region corresponding to the solution of the system of constraints.

$$\begin{aligned} f(x, y) &= 3y + x \\ x &\geq 0 \\ y &\geq -2 \\ 9x + 13y &\leq 114 \\ 10x + 7y &\leq 82 \\ 2x + 2y &\geq 10 \end{aligned}$$



6. Use an inverse matrix to solve the system of equations, if possible.

$$\begin{aligned} 3x - 2y + z &= -15 \\ 6x - 4y + 5z &= -54 \\ 4x + 8y - z &= -44 \end{aligned}$$

- a. $(-5, -4, -8)$ b. $(-7, 6, -8)$
c. $(-7, -5, -4)$ d. no solution

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7. Write the augmented matrix for the system of linear equations.

$$9w + 9x + 9y + 7z = -7$$

$$5x - 6y + 5z = 5$$

$$3w - 7x + 2y - 7z = 4$$

$$w - 4x + 9y = 1$$

a.
$$\left[\begin{array}{cccc|c} 9 & 9 & 9 & 7 & -7 \\ 0 & 5 & -6 & 5 & 5 \\ 3 & -7 & 2 & -7 & 4 \\ 1 & -4 & 9 & 0 & 1 \end{array} \right]$$

b.
$$\left[\begin{array}{cccc|c} 3 & -7 & 2 & -7 & 4 \\ 0 & 5 & -6 & 5 & 5 \\ 9 & 9 & 9 & 7 & -7 \\ 0 & 1 & -4 & 9 & 1 \end{array} \right]$$

c.
$$\left[\begin{array}{cccc|c} 9 & 9 & 9 & 7 & -7 \\ 5 & 5 & -6 & 5 & 5 \\ 1 & -4 & 9 & 9 & 1 \\ 3 & -7 & 2 & -7 & 4 \end{array} \right]$$

d.
$$\left[\begin{array}{cccc|c} 3 & -7 & 2 & -7 & 4 \\ 5 & -6 & 5 & 5 & 0 \\ 9 & 9 & 9 & 7 & -7 \\ 1 & -4 & 9 & 1 & 0 \end{array} \right]$$

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8. Graph the region corresponding to the solution of the system of constraints.

$$f(x, y) = 3y + x$$

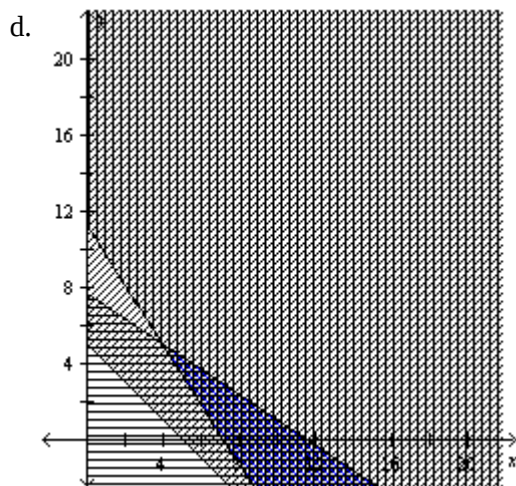
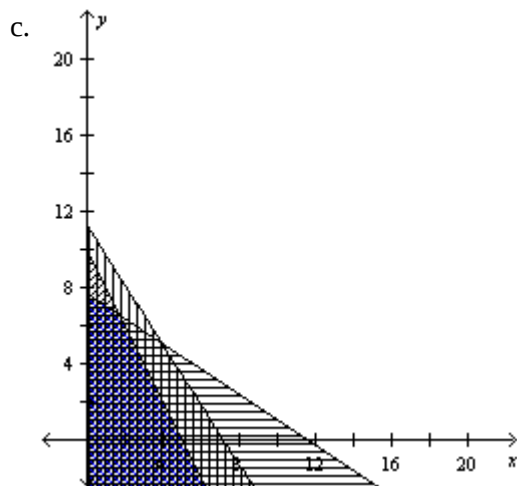
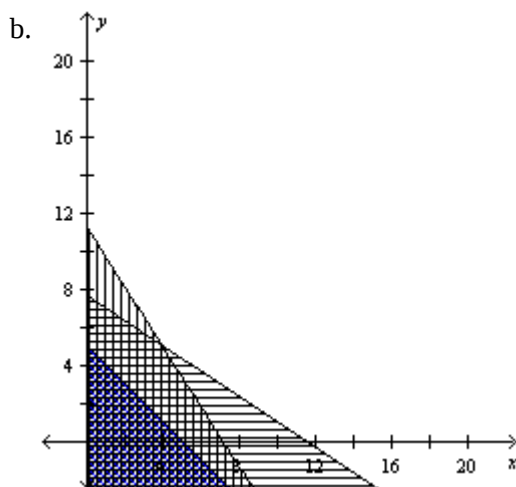
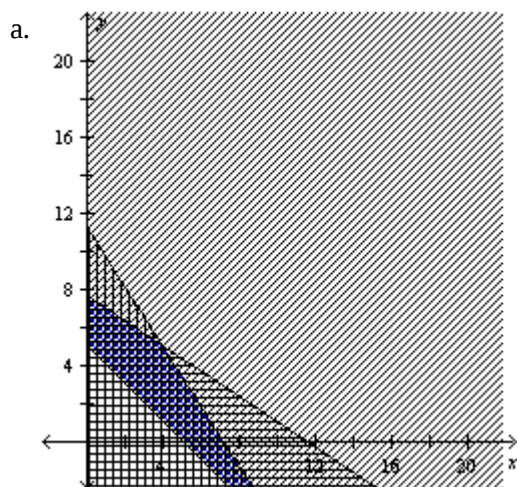
$$x \geq 0$$

$$y \geq -2$$

$$8x + 12y \leq 92$$

$$11x + 7y \leq 79$$

$$x + y \geq 5$$



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9. Write the augmented matrix for the system of linear equations.

$$8w - x - 8y - 7z = 0$$

$$-5x + 9y - 6z = 5$$

$$2w + 7x + 5y - 2z = 6$$

$$w - 7x + y = 9$$

a. $\left[\begin{array}{cccc|c} 8 & -1 & -8 & -7 & 0 \\ -5 & -5 & 9 & -6 & 5 \\ 1 & -7 & 1 & 1 & 9 \\ 2 & 7 & 5 & -2 & 6 \end{array} \right]$

b. $\left[\begin{array}{cccc|c} 2 & 7 & 5 & -2 & 6 \\ -5 & 9 & -6 & 5 & 0 \\ 8 & -1 & -8 & -7 & 0 \\ 1 & -7 & 1 & 9 & 0 \end{array} \right]$

c. $\left[\begin{array}{cccc|c} 2 & 7 & 5 & -2 & 6 \\ 0 & -5 & 9 & -6 & 5 \\ 8 & -1 & -8 & -7 & 0 \\ 0 & 1 & -7 & 1 & 9 \end{array} \right]$

d. $\left[\begin{array}{cccc|c} 8 & -1 & -8 & -7 & 0 \\ 0 & -5 & 9 & -6 & 5 \\ 2 & 7 & 5 & -2 & 6 \\ 1 & -7 & 1 & 0 & 9 \end{array} \right]$

10. Solve the system of equations.

$$-3x + 3y - 9z + 42w = -42$$

$$-6x + 3y - 18z + 96w = -54$$

$$x - y + 2z - 10w = 11$$

a. $(-8 - w, -7 + 10w, -2 - 10w, w)$

b. $(4 + 4w, 4 + 4w, 3 - 2w, w)$

c. $(4, -133, 1, 9)$

d. $(-5 + 6w, -10 + 4w, 3 + 4w, w)$

11. If $A = \begin{bmatrix} 2 & 8 & 4 \\ -3 & 5 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 8 \\ 1 & 5 \end{bmatrix}$, find AB .

a. $\begin{bmatrix} 4 & 64 & -3 \\ -3 & 25 & -2 \end{bmatrix}$

b. $\begin{bmatrix} 12 & 56 \\ -1 & 1 \end{bmatrix}$

c. $\begin{bmatrix} 16 & 60 \\ -3 & -1 \end{bmatrix}$

d. Not possible

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12. Find the determinant of $L = \begin{bmatrix} -5 & -5 & 3 \\ 5 & -3 & 2 \\ 3 & 1 & 2 \end{bmatrix}$.

- a. -102 b. 102
c. 88 d. -22

13. Find the partial fraction decomposition of $\frac{13x-18}{x^2+3x-54}$.

- a. $\frac{9}{x-6} + \frac{4}{x+9}$ b. $\frac{4}{x-6} - \frac{9}{x+9}$
c. $\frac{4}{x-6} + \frac{9}{x+9}$ d. $\frac{9}{x-6} - \frac{4}{x+9}$

14. Solve the matrix equation by using inverse matrices.

$$\begin{bmatrix} 4 & 4 \\ -2 & 1 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 0 \\ 3 \end{bmatrix}$$

- a. (0, -3) b. (-1, 1)
c. (-1, -1) d. (1, 1)

15. Find the partial fraction decomposition of the rational expression with repeated factors, $\frac{-6x^2+52x-144}{x^3-12x^2+36x}$

- a. $\frac{-4}{x} + \frac{-2}{x-6} + \frac{-8}{x-6}$ b. $-4 + \frac{2}{x-6} + \frac{-8}{x^2}$
c. $\frac{-4}{x} + \frac{-2}{x-6} + \frac{-8}{(x-6)^2}$ d. $\frac{-4}{x} + \frac{2}{x-6} + \frac{-8}{(x-6)^2}$

16. If $A = \begin{bmatrix} 5 & 8 \\ -5 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 6 \\ 5 & -1 \end{bmatrix}$, find AB .

- a. $\begin{bmatrix} -60 & -22 \\ -5 & 35 \end{bmatrix}$ b. $\begin{bmatrix} 60 & 22 \\ 5 & -35 \end{bmatrix}$
c. $\begin{bmatrix} 20 & 48 \\ -25 & -5 \end{bmatrix}$ d. Not possible

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17. Find the partial fraction decomposition of $\frac{-9x-50}{x^2+x-42}$.

a. $\frac{-1}{x+7} + \frac{-8}{x-6}$ b. $\frac{-1}{x+7} - \frac{-8}{x-6}$

c. $\frac{-8}{x+7} - \frac{-1}{x-6}$ d. $\frac{-8}{x+7} + \frac{-1}{x-6}$

18. If $A = \begin{bmatrix} 4 & 7 & 5 \\ -5 & 1 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 9 \\ 1 & 5 \end{bmatrix}$, find AB .

a. $\begin{bmatrix} 4 & 63 & -5 \\ -5 & 5 & -2 \end{bmatrix}$ b. $\begin{bmatrix} 11 & 71 \\ -4 & -40 \end{bmatrix}$

c. $\begin{bmatrix} 16 & 76 \\ -6 & -42 \end{bmatrix}$ d. Not possible

19. Write a matrix equation for the given systems of equations.

$$3x - 6y - z = 1$$

$$5y - 5z = -3$$

$$2y + 4z = -1$$

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

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

20. Find the partial fraction decomposition of the improper rational expression $\frac{-x^2-2x-6}{x^2-2x-8}$.

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

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

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