

Secondary 1 Honors Chapter 9 – Matrix Review

Solve for each variable.

$$1. \begin{bmatrix} 3x+1 \\ 2y \end{bmatrix} = \begin{bmatrix} 10 \\ 4+y \end{bmatrix} \quad \begin{matrix} x=3 \\ y=4 \end{matrix}$$

$$2. \begin{bmatrix} 2x & y+1 \\ 13 & -2 \end{bmatrix} = \begin{bmatrix} -16 & -7 \\ 13 & z-8 \end{bmatrix}$$

$$x = -8 \quad y = -8 \quad z = 6$$

$$3. \begin{bmatrix} 43 & z \\ 7x-2 & 2x+3 \end{bmatrix} = \begin{bmatrix} z+3 & 2m+5 \\ y & 37 \end{bmatrix} \quad z=40 \quad m = 35/2 \quad x=17 \quad y=117$$

Evaluate if possible.

$$4. \begin{bmatrix} 1 & 2 \\ 9 & 1 \\ 6 & 7 \end{bmatrix} + \begin{bmatrix} 3 & -2 \\ 5 & -1 \\ 6 & 9 \end{bmatrix}$$

$$\begin{bmatrix} 4 & 0 \\ 14 & 0 \\ 12 & 16 \end{bmatrix}$$

$$5. \begin{bmatrix} 9 & -2 & 6 \\ -6 & 1 & 3 \end{bmatrix} - \begin{bmatrix} -7 & 4 & 0 \\ -2 & 3 & -2 \end{bmatrix}$$

$$\begin{bmatrix} 16 & -6 & 6 \\ -4 & -2 & 5 \end{bmatrix}$$

$$6. \begin{bmatrix} 2 & -4 & 1 \\ 3 & 8 & -2 \end{bmatrix} - 2 \begin{bmatrix} 1 & 2 & -4 \\ -2 & 3 & 7 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -8 & 9 \\ 7 & 2 & -16 \end{bmatrix}$$

$$7. -4 \begin{bmatrix} 3 & -2 & 5 \\ 0 & -9 & 4 \end{bmatrix} - 3 \begin{bmatrix} 4 & 0 & -2 \\ -1 & 12 & -5 \end{bmatrix}$$

$$\begin{bmatrix} -24 & 8 & -14 \\ 3 & 0 & -1 \end{bmatrix}$$

$$8. \frac{1}{2} \begin{bmatrix} -4 & 3 \\ -5 & 2 \end{bmatrix} + 3 \begin{bmatrix} 1 & -3 \\ 3 & -8 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -13/2 \\ 13/2 & -23 \end{bmatrix}$$

$$9. \begin{bmatrix} 1 & -5 \\ -2 & 3 \end{bmatrix} + \frac{3}{4} \begin{bmatrix} 0 & 4 \\ -16 & 8 \\ 8 & 28 \end{bmatrix}$$

Not Defined

Evaluate if possible.

$$10. \begin{bmatrix} 1 & 6 & 7 \\ 1 & -3 & -4 \end{bmatrix} \cdot \begin{bmatrix} -4 & 3 \\ -1 & -2 \\ 2 & 5 \end{bmatrix}$$

$$\begin{bmatrix} 4 & 26 \\ -9 & -11 \end{bmatrix}$$

$$11. \begin{bmatrix} 3 & 4 \\ 1 & 0 \\ 2 & -5 \end{bmatrix} \cdot \begin{bmatrix} -2 & 4 & 5 \\ 3 & 0 & -1 \\ 1 & 0 & -1 \end{bmatrix}$$

Not Defined

$$12. \begin{bmatrix} 8 & -3 \\ 6 & 1 \end{bmatrix} \cdot \begin{bmatrix} 2 & -3 \\ 1 & -5 \end{bmatrix}$$

$$\begin{bmatrix} 13 & -9 \\ 13 & -23 \end{bmatrix}$$

$$13. [2 \ 7] \cdot \begin{bmatrix} 5 \\ -4 \end{bmatrix}$$

$$[-18]$$

$$14. \begin{bmatrix} 11 & 9 & -2 \\ 3 & -1 & -4 \end{bmatrix} \cdot \begin{bmatrix} 4 & -2 \\ 5 & 1 \end{bmatrix}$$

Not Defined

$$15. \begin{bmatrix} 3 & 0 & -1 \\ 4 & -2 & 3 \end{bmatrix} \cdot \begin{bmatrix} 7 & 1 \\ 6 & -3 \\ 2 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 19 & 2 \\ 22 & 13 \end{bmatrix}$$

$$16. [6 \ 4 \ 1] \cdot \begin{bmatrix} 2 & 5 \\ -3 & 0 \\ -1 & 3 \end{bmatrix}$$

$$[-1 \ 33]$$

$$17. \begin{bmatrix} 2 & 1 & -3 \\ 1 & -3 & 2 \end{bmatrix} \cdot \begin{bmatrix} 1 & 4 & 9 \\ -2 & 6 & -3 \\ 3 & 2 & 1 \end{bmatrix}$$

$$\begin{bmatrix} -9 & 8 & 12 \\ 13 & -10 & 20 \end{bmatrix}$$

Evaluate the determinant.

$$18. \begin{vmatrix} -1 & 4 \\ -6 & 3 \end{vmatrix}$$

21

$$19. \begin{vmatrix} 4 & 11 \\ -7 & 8 \end{vmatrix}$$

109

$$20. \begin{vmatrix} 6 & -7 \\ -5 & 3 \end{vmatrix}$$

-17

$$21. \begin{vmatrix} 12 & 8 \\ 9 & 6 \end{vmatrix}$$

0

Evaluate the determinant using diagonals.

$$22. \begin{vmatrix} 2 & -3 & 1 \\ 0 & 1 & 0 \\ 2 & 1 & 0 \end{vmatrix}$$

-2

$$23. \begin{vmatrix} 0 & 1 & 0 \\ 2 & 4 & 2 \\ -1 & -6 & 1 \end{vmatrix}$$

-4

$$24. \begin{vmatrix} 1 & 6 & -1 \\ 1 & -4 & 3 \\ 0 & -1 & 2 \end{vmatrix}$$

-16

$$25. \begin{vmatrix} 5 & -3 & 2 \\ -6 & 1 & 3 \\ -1 & 4 & 7 \end{vmatrix}$$

-188

$$26. \begin{vmatrix} 3 & 1 & 5 \\ 1 & -2 & 1 \\ 0 & -1 & 2 \end{vmatrix}$$

-16

$$27. \begin{vmatrix} 6 & 3 & -2 \\ -4 & 2 & 5 \\ -3 & -1 & 0 \end{vmatrix}$$

-35

Given the vertices, find the area of the triangle using a determinant.

28. $(3,4)$ $(-5,-3)$ $(-2,1)$

$$5.5 \text{ units}^2$$

29. $(0,-3)$ $(1,2)$ $(-6,3)$

$$18 \text{ units}^2$$

30. $(-1,5)$ $(2,0)$ $(3,-5)$

$$5 \text{ units}^2$$

Solve the following systems of equations using augmented matrices.

31. $x + 4y = -4$
 $x + 10y = -16$

$$x = 4 \quad y = -2$$

32. $2x + 2y = 4$
 $2x - 8y = -46$

$$x = -3 \quad y = 5$$

33. $2x + 9y = 3$
 $5x + 4y = 26$

$x = 6$ $y = -1$

Use the matrices below to answer the following questions.

$A = \begin{bmatrix} 2 & 6 \\ 3 & 6 \end{bmatrix}$ $B = \begin{bmatrix} -1 & 1 \\ \frac{1}{2} & -\frac{1}{3} \end{bmatrix}$ $C = \begin{bmatrix} -6 & 3 \\ 2 & -6 \end{bmatrix}$

34. Find $A+B$

$\begin{bmatrix} 1 & 7 \\ 7/2 & 17/3 \end{bmatrix}$

35. Find $3C - A$

$\begin{bmatrix} -20 & 3 \\ 3 & -24 \end{bmatrix}$

36. $A \circ C$

$\begin{bmatrix} 0 & -30 \\ -6 & -27 \end{bmatrix}$

37. Are A and C inverses? Explain why or why not.

Not inverses

$A \cdot C \neq I$

38. Are A and B inverses? Explain why or why not.

Yes inverses

$A \cdot B = I$

39. Are B and C inverses? Explain why or why not.

Not inverses

$B \cdot C \neq I$

Given matrices $A = \begin{bmatrix} 3 & -4 & 5 \\ 2 & -1 & 0 \\ -5 & 2 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 3 & 2 \\ 5 & -2 \end{bmatrix}$ and $C = \begin{bmatrix} -5 & 2 & 11 \\ \frac{1}{2} & -13 & -2 \end{bmatrix}$

40. Evaluate A^2 $\begin{bmatrix} -24 & 2 & 20 \\ 4 & -7 & 10 \\ -16 & 20 & -24 \end{bmatrix}$

41. Evaluate B^3 $\begin{bmatrix} 67 & 34 \\ 85 & -18 \end{bmatrix}$

42. Evaluate C^2 Not Defined

Solve the matrix equation.

43.

$$\begin{bmatrix} 2 & -5 \\ -3 & 7 \end{bmatrix} X = \begin{bmatrix} 48 & -10 \\ -69 & 14 \end{bmatrix}$$

$$X = \begin{bmatrix} 9 & 0 \\ -6 & 2 \end{bmatrix}$$

44.

$$\begin{bmatrix} 3 & 3 \\ 5 & 6 \end{bmatrix} X = \begin{bmatrix} 0 & 15 \\ 2 & 26 \end{bmatrix}$$

$$X = \begin{bmatrix} -2 & 4 \\ 2 & 1 \end{bmatrix}$$

Find the inverse of each of the following matrices, if possible.

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

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

46. $\begin{bmatrix} 6 & 2 \\ 5 & 2 \end{bmatrix}$

$$\begin{bmatrix} 1 & -1 \\ -5/2 & 3 \end{bmatrix}$$

47. $\begin{bmatrix} 8 & -4 \\ -6 & 3 \end{bmatrix}$

Not possible

$$\frac{1}{0} = \text{undefined}$$

48. $\begin{bmatrix} -4 & -6 \\ 4 & 7 \end{bmatrix}$

$$\begin{bmatrix} -7/4 & -3/2 \\ 1 & 1 \end{bmatrix}$$

49. $\begin{bmatrix} -24 & 60 \\ -6 & 30 \end{bmatrix}$

$$\begin{bmatrix} -1/12 & 1/6 \\ -1/60 & 1/15 \end{bmatrix}$$

Solve the matrix equation

50. $\begin{bmatrix} 5 & 2 \\ 0 & 1 \end{bmatrix} X + \begin{bmatrix} -8 & -18 \\ 10 & 1 \end{bmatrix} = \begin{bmatrix} -1 & 16 \\ 6 & 3 \end{bmatrix}$

$$X = \begin{bmatrix} 3 & 6 \\ -4 & 2 \end{bmatrix}$$