Name KEY Date _____ Period ___

Adding and Subtracting Matrices

Find each sum or difference.

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

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

3. $\begin{bmatrix}4 & 2\\ 6 & -2\\ 3 & 4\\ -3 & 0\end{bmatrix}+\begin{bmatrix}3 & -2\\ 2 & 0\\ 1 & 1\\ 1 & -2\end{bmatrix}=\begin{bmatrix}7 & 0\\ 8 & -2\\ 4 & 5\\ -2 & -2\end{bmatrix}$

4. $\begin{bmatrix}0.8 & -0.3\\ 1.7 & 2.4\end{bmatrix}-\begin{bmatrix}0.2 & 0.3\\ 0.4 & -1.4\end{bmatrix}=\begin{bmatrix}0.6 & -0.6\\ 1.3 & 3.8\end{bmatrix}$

Solve each matrix equation.

5. $C+\begin{bmatrix}3 & 5\\ 10 & 2\\ 1 & 5\end{bmatrix}=\begin{bmatrix}5 & 3\\ 8 & 12\\ 0 & 2\end{bmatrix}$ $\Rightarrow C=\begin{bmatrix}5 & 3\\ 8 & 12\\ 0 & 2\end{bmatrix}-\begin{bmatrix}3 & 5\\ 10 & 2\\ 1 & 5\end{bmatrix}=\begin{bmatrix}2 & -2\\ -2 & 10\\ -1 & -3\end{bmatrix}$

6. $B-\begin{bmatrix}0 & -7 & 4\\ 9 & -1 & 5\\ -1 & 0 & -5\end{bmatrix}=\begin{bmatrix}2 & 9 & -3\\ 0 & 1 & -6\\ 4 & -1 & 12\end{bmatrix}$ $\Rightarrow B=\begin{bmatrix}2 & 9 & -3\\ 0 & 1 & -6\\ 4 & -1 & 12\end{bmatrix}+\begin{bmatrix}0 & -7 & 4\\ 9 & -1 & 5\\ -1 & 0 & -5\end{bmatrix}=\begin{bmatrix}2 & 2 & 1\\ 9 & 0 & -1\\ 3 & -1 & 7\end{bmatrix}$

7. $\begin{bmatrix}2 & 3\\ -2 & -2\end{bmatrix}=X-\begin{bmatrix}-1 & -3\\ -1 & 2\end{bmatrix}$ $\Rightarrow X=\begin{bmatrix}2 & 3\\ -2 & -2\end{bmatrix}+\begin{bmatrix}-1 & -3\\ -1 & 2\end{bmatrix}=\begin{bmatrix}1 & 0\\ -3 & 0\end{bmatrix}$

8. $\begin{bmatrix}2 & 2 & 0\\ 1 & -1 & -1\end{bmatrix}=\begin{bmatrix}2 & -2 & 5\\ -3 & 3 & 2\end{bmatrix}+Y$ $\Rightarrow Y=\begin{bmatrix}2 & 2 & 0\\ 1 & -1 & -1\end{bmatrix}+\begin{bmatrix}-2+2-5\\ +3-3-2\end{bmatrix}=\begin{bmatrix}0 & 4 & -5\\ 4 & -4 & -3\end{bmatrix}$

Find each sum.

9. $\begin{bmatrix}2 & -3 & 4\\ 5 & -4 & 0\end{bmatrix}+\begin{bmatrix}-2 & 3 & -4\\ -5 & 4 & 0\end{bmatrix}=\begin{bmatrix}0 & 0 & 0\\ 0 & 0 & 0\end{bmatrix}$

10. $\begin{bmatrix}10 & -2\\ 4 & -1\end{bmatrix}+\begin{bmatrix}0 & 0\\ 0 & 0\end{bmatrix}=\begin{bmatrix}10 & -2\\ 4 & -1\end{bmatrix}$

Find the value of each variable.

11. $\begin{bmatrix}14 & 10\\ -7 & -1\end{bmatrix}=\begin{bmatrix}3a-1 & 2a\\ 5b+3 & a+3b\end{bmatrix}$ $a=15$, $b=-2$

$14=3a-1$, $a=15$; $-7=5b+3=-2$

12. $\begin{bmatrix}4 & -3\\ 6 & 1\end{bmatrix}-\begin{bmatrix}2 & 0\\ -1 & -2\end{bmatrix}=\begin{bmatrix}p & q\\ 7 & r\end{bmatrix}$ $p=2$, $q=-3$, $r=3$

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

Find each matrix sum or difference if possible. If not possible, explain.

$M=\begin{bmatrix}0 & 2 & 5\\ 7 & 3 & 4\end{bmatrix}$ $N=\begin{bmatrix}-1 & -3 & 4\\ 8 & 5 & 0\end{bmatrix}$ $P=\begin{bmatrix}2 & -3 & 0\\ 8 & 2 & 4\\ 6 & -4 & 1\end{bmatrix}$ $Q=\begin{bmatrix}1 & -2 & 4\\ 4 & 6 & 2\\ 0 & -2 & 5\end{bmatrix}$

13. $M+N$ $\begin{bmatrix}-1 & -1 & 9\\ 15 & 8 & 4\end{bmatrix}$

14. $Q-P$ $\begin{bmatrix}1 & -1 & -4\\ 4 & -4 & 2\\ -6 & -2 & -4\end{bmatrix}$

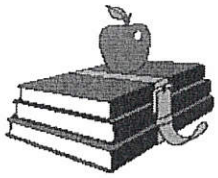
15. $Q+N$ [X] Not possible; Dif. Dimensions

16. $P+Q$ $\begin{bmatrix}3 & -5 & 4\\ 12 & 8 & 6\\ 6 & -6 & 6\end{bmatrix}$

17. The table shows the number of males and females in four clubs at a high school for two school years.

Club Membership

	1971-1972		2010-2011	
	Males	**Females**	**Males**	**Females**
Book	7	27	56	58
Spanish	43	64	76	82
Chess	28	0	35	26
French	16	18	59	73



A B C D

a. Write four 4 × 1 matrices, A, B, C, and D, to represent the male and female club membership for 1971–1972 and 2010–2011.

b. Write and solve a matrix equation to find matrix X, the total number of members in each club for 1971–1972.

$\begin{bmatrix} 34 \\ 107 \\ 28 \\ 34 \end{bmatrix}$

c. Did the total number of female club member's increase or decrease between the two school years, and by what amount? yes, by 130

18. **Think about it:** Let $C = \begin{bmatrix} c_{11} & c_{12} \\ c_{21} & c_{22} \end{bmatrix}$, $D = \begin{bmatrix} d_{11} & d_{12} \\ d_{21} & d_{22} \end{bmatrix}$, and $C + D = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

If $c_{11} \cdot d_{11} = -6$ and $c_{11} > 0$, what is the value of d_{11}?

$c_{11} \cdot d_{11} = -6 \quad c_{11} > 0 \quad \& \quad C + D = 0$

$d_{11} = -\sqrt{6}$

Relay Race Results:

19. The table shows the time each member of two relay teams took to complete his leg of a relay race. Team II won the race by 3 seconds. How many seconds did Gino take to run his leg of the race?

	Team I		Team II	
Leg	**Name**	**Time (s)**	**Name**	**Time (s)**
1	Juan	22	Miguel	23
2	Julio	25	James	22
3	Alex	23	Gino	26
4	Ted	21	Cody	20

Writing: Determine whether the two matrices in each pair are equal. Explain.

20. $\begin{bmatrix} 2 & \frac{3}{4} & -1 \\ \sqrt{16} & 4 & 9 \end{bmatrix}$; $\begin{bmatrix} \frac{4}{2} & 3 & 4^2 \end{bmatrix}$

No, not the same dimension and #'s aren't equal

21. $\begin{bmatrix} 2\sqrt{9} & 3^2 \\ 7 & \frac{15}{3} \end{bmatrix}$; $\begin{bmatrix} 6 & 9 \\ 7 & 5 \end{bmatrix}$

Yes, each value is equivalent to the corresponding element in the other matrix.